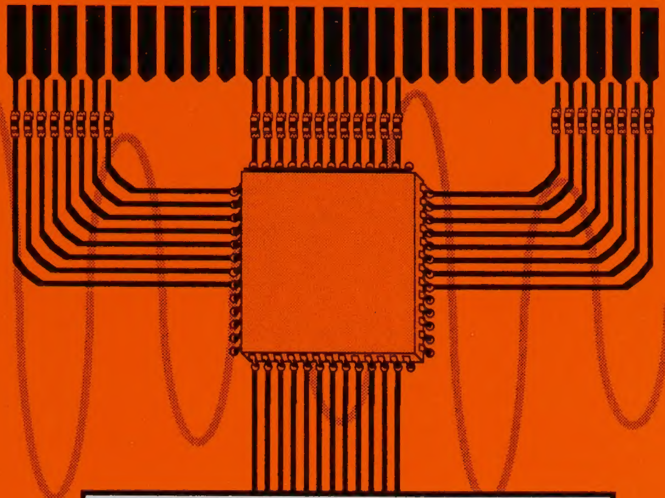
Radio / Tech Modifications

& Alignment Controls

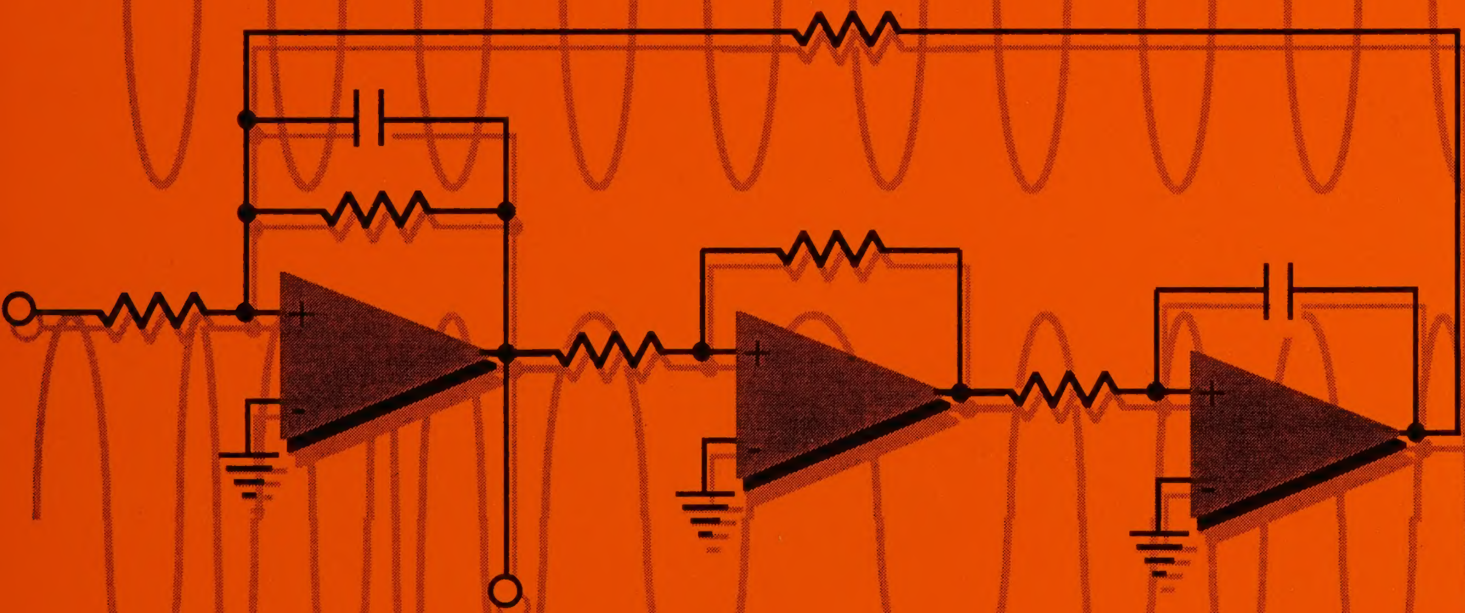


Edition 14 B

B

Modifications for:

Alinco
Standard
Yaesu
Others
CB Radios



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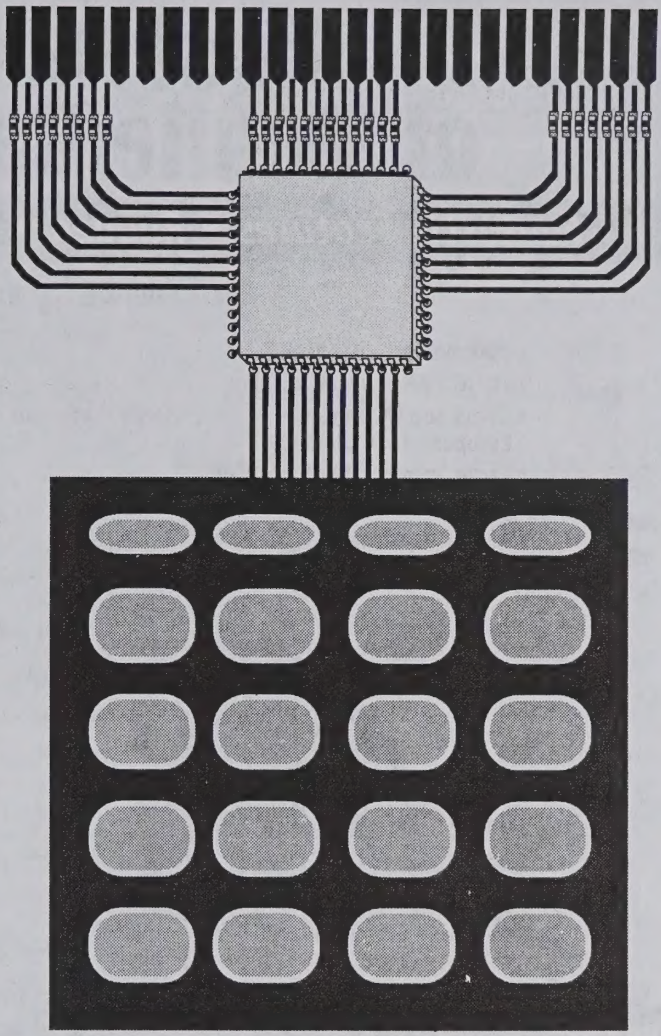
Radio / Tech Modifications

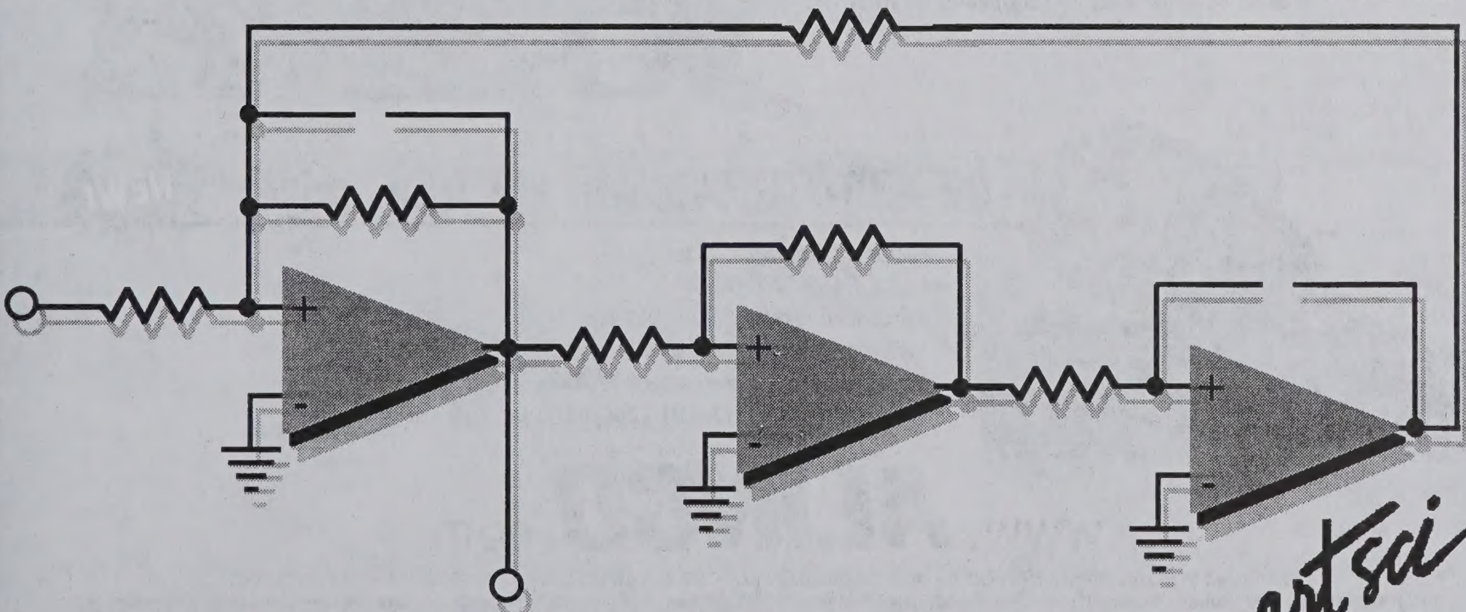
& Alignment Controls

B



Modifications for:

- Alinco
- Standard
- Yaesu
- Others
- CB Radios



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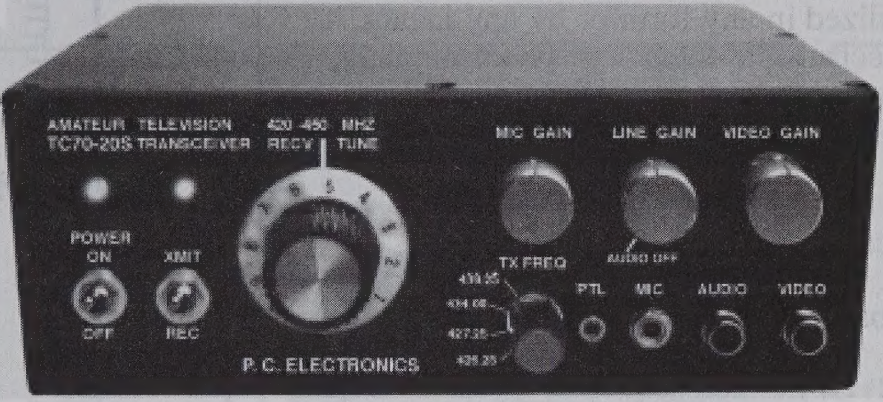

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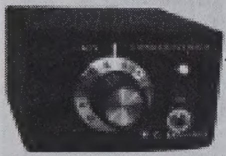

Model TVC-4G ATV Downconverter
tunes 420-450 MHz to ch 3
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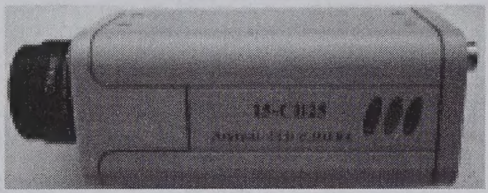
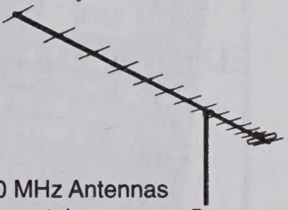
Just want to try receiving ATV, lend to a friend, go portable or for R/C but with the best sensitivity? Get this low noise downconverter! Connect between your TV set and antenna. 12Vdc/115 Vac wallplug power supply included.



CB25 Low Cost, Hi Rez Color Camera.$185

420 line rez with 1/3" Sony CCD - 510(H) x 492(V), 1 lux, AGC built in, 46 dB S/N ratio, auto iris, white ballance & shutter. 6mm adjustable focus CS mount lens supplied as well as a 12Vdc @ 300 ma/115 Vac wall plug power supply. 4.1 x 1.8 x 2.25 in.



420-450 MHz Antennas
- see our catalogue page 5

All prices include UPS surface in USA

Dir. Sys. DSFO ATV-25 yagi	**16 dBd**	**$159**
OAL-5L-70cm Yagi end mtg	**8 dBd**	**$70**
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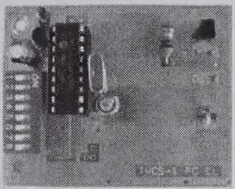

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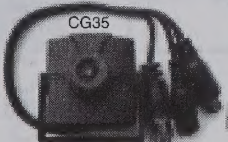
NEW! TVCS-1 Downconverter Synthesizer....$79

Add this board piggy back above your tuneable TVC-2G, TVC-9 or TVC-12G downconverter board and get 4 or more crystal locked selectable channels in the band. Easy to install and operate.

Hard Hat Cam, R/C Vehicle, Rocket, Balloon ATV

App notes available on web page 3

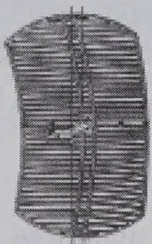


CG35 mini color camera......$99
1.5" sq., 3oz., 330 lines, 6mm lens, Sony CCD, mic/line audio output, takes just 9Vdc @30ma.

Videolynx 434 MHz Video Xmtr........$99
50-100 mW, .6x.8x2.3", 1.5 oz., 9V@40ma
Great for line of sight up to 1/2 mile.

TXA5-RC 1.5 W ATV Xmtr board....$129
For greater DX to 5 miles dipole to dipole.

2.4 GHz Dish for AO-40 or ATV



Andrews 26T-2400 Dish

50 Ohm Feed with N plug. 22 dBd gain. 2' x 3.4' rugged cast magnesium/aluminum. Mount horizontal or vertical or tilt on up to 1.75" dia. masts......................$149

Downeast 13LNAH Preamp, antenna mount, low noise......**$125**

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Hams, ask for our free ATV catalogue or down load from our web site - AM, FM, 70cm to 10GHz Application notes can be downloaded or requested from page 3 of the web site - We have it all!

Radio / Tech Modifications

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artsci inc.,
P.O. Box 1428
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(818) 843-4080 Voice
(818) 846-2298 FAX
artsci@artscipub.com
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EDITION 14B

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Modifications

Edition 14B

Modifications and Alignment controls

IN THIS EDITION

INTRODUCTION.......................... 7

Phone support and new modifications
Scanner modification problems
Modifications and the law

SURFACE MOUNT COMPONENTS............................. 14

How to remove them
How to install them
Common chip diode layouts

Amateur Radios

ALINCO........................... Alinco-1

STANDARD/HEATH.......Standard-1

YAESU................................ Yaesu-1

OTHER MANUFACTURES............. Other-1

ADI, Azden, Heath, KDK
Radio Shack, Ranger, RCI
Sender, Ten Tec, Unide
Ameritron, Magnum

CB Radios

CB Radios.......................CB Radios-1

PROOF OF PURCHASE....Last Page

Most modern Communication radios can be modified to improve performance or frequency range. The manufactures design the microprocessors to be used in multiple products. Each radio often has jumpers or circuits to select a RF band or frequency range.

If you have even wondered how to enhance your Amateur radio, scanner or CB, then this book is for you. Detailed picture drawings and step by step instructions will guide you through the modifications.

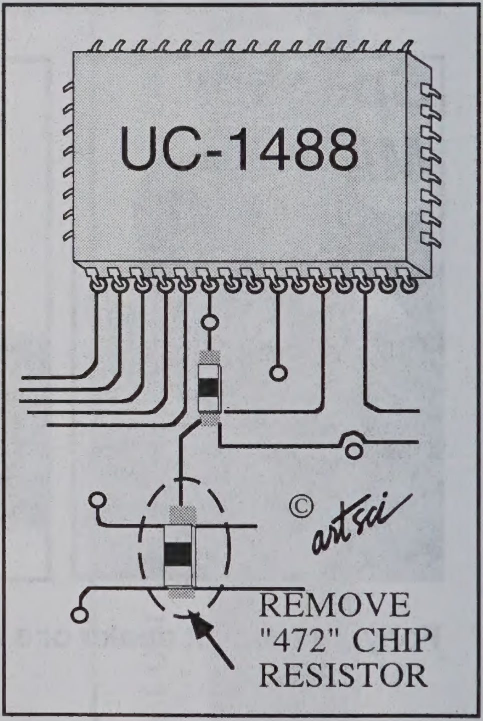
Modifications include extended transmit and receive frequency coverage, cross band (repeater) operation and increased memory channels (different radios have different modification features). Alignment control drawings are presented with most modifications.

Some modifications are very simple to perform, others require experience with soldering and unsoldering. If additional parts are required, the part number and source is given.

Many of the modification in this book require the removal of micro components. Soldering skill is often required.

Replacement part can be ordered directly from the radio manufacturer. Your local radio store may have some of the popular parts in stock.

Ask about Edition 14A if you have a Kenwood, Icom or scanner.



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www.artscipub.com

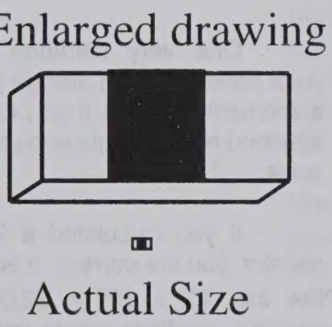
Little parts big results

Bill Smith, N6MOS

I am more amazed everyday when I see electronic parts getting smaller. Its not just my eye that are going bad and making things harder to see. Radio manufactures are cramming new features into smaller and smaller packages. I am forced to work with these mini components when I modify my own radio equipment.

A few years ago I ordered 50 mini chip resistors for myself and my friends. I opened the plastic bag attempting to place a few in an envelope. I dropped the bag and most of the parts fell onto the carpet. I was on my hands and knees for 10 minutes picking at the carpet to find the parts. More than half the supply was lost in the carpet matt.

Perhaps the most impressive aspect is the effect this little part has when when inserted into a radio (following the modification instructions). This little part changed the range of the radio from 4 Mhz to over 30 MHz.



Today I use a magnifying lamp and my glasses come on and off my face more often than the soldering iron touches the components. I'll be happy as long as my fingers don't grow fatter and the buttons on the new radios don't get too small.

WHAT HAPPNED TO EDITIONS 13A & 13B?

Editions 13A and 13B are alive and well on the Internet. We experimented with an internet electronic version requiring a membership fee. We are pleased to have many on-line members. All the modifications in these new editions are also presented electronically at:

www.radiomods.com

Editor	William V. R. Smith N6MQS
Assistant Editor	Paul Essick Kris Smith James M. Smith
Advertising Manager	Doug Wynn WY6NN
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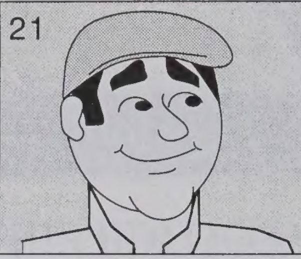
Radio/Tech Modifications are produced with the help and support of a great many people, many who do not wished to be named. We would like to thank everyone who has sent us information and modifications over the years.

Visit our website for free amateur radio information and additional product information



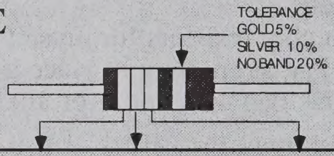
BOB Simpleton's Guide to Color codes

As seen in the **Amateur Radio Trader**

The electronic industry created a standard for color coding parts many, many years ago. The same color code is used on all different types of components. With a little effort, and a good memory, the basic color code can be memorized. In color code sequence is: BLACK, BROWN, RED, ORANGE, YELLOW, GREEN, BLUE, VIOLET, GRAY and WHITE. The number sequence that corresponses with the color code starts with zero; Black=0, Brown=1, Red=2, etc.

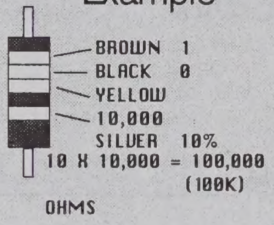
Components using color stripes and surface mount components use the 'significant' digit system paired with a multiplier digit, based on the powers of ten. An additional color stripe is also used to determine the accuracy or tolerance of the component. Higher accuracy components requires more significant digits to accurately describe the value. 5% accuracy parts use two 2 significent digits colors stripes followed by the multliper color stripe. 2% and 1% components often use 3 significent digit colors stripes .

RESISTOR COLOR CODE



COLOR	1st DIGIT	2nd DIGIT	MULTIPLY BY
BLACK	0	0	1
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
VIOLET	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	1,000,000,00
GOLD			0
SILVER			.1
			.01

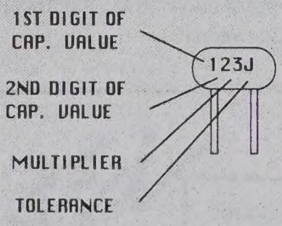
Example



Resistor standard values (significant digits)

10	brown	black	33	orange	orange
11	brown	brown	36	orange	blue
12	brown	red	39	orange	white
13	brown	orange	43	yellow	orange
15	brown	green	47	yellow	purple
16	brown	blue	51	green	brown
18	brown	gray	56	green	blue
20	red	black	62	blue	red
22	red	red	68	blue	gray
24	red	yellow	75	purple	green
27	red	purple	82	gray	red
30	orange	black	91	white	brown

CAPACITORS



MULTIPLIER		TOLERANCE		
	MULTIPLY BY		10pF or less	over 10pF
0	1	B	0.1pF	
1	10	C	0.25pF	
2	100	D	0.5pF	
3	1,000	F	1.0pf	1%
4	10,000	G	2.0pf	2%
5	100,000	H		3%
		J		5%
8	.01	K		10%
9	0.1	M		20%

Most common resistors are in the 5 to 10% tolerance range. Silver is used for 10% and gold is used for 5%. 20% resistors have no tolerance color bar.

One very common resistor is color coded: red red orange gold. Take a moment and see if you can use the attached resistor table and calculate the value..

If you calculated a 22,000, 5% resistor, you are correct. It is calculated like this: $22 \times 10^3 = 22{,}000$. What possible readings would you expect if you connected this resistor to an ohm meter?

Since it is a 5% tolerance resistor, the measured value will be between 19.800 and 24,200 ohms. That is calculated be allow 5% above and below the stated value.

Surface mount resistors do not use color stripes. The 2 significent digits and multiplier digit are printed right on the top of the component. These components are very, very small. The printed digits are often so small, you may need a magnifying glass to read them.

A surface mount resistor marked 103 would be a 10,000 ohm resistor (10k ohms). For everyone interested in mathematics, the formula is $10 \times 10^3 = 10{,}000$

A little practice will make reading resistors and other electronic componets easy as pi. 73, Bob

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Editors Comments

Creating the Radio/Tech modification books have been quite an experience. During these past years, we have learned about all types of people who are members of our hobby. Truck drivers, astronauts, computer programmers, policemen, actors and congressmen are some of the persons who have earned their Amateur radio license.

Hundreds of police officers, firemen and other government officials have purchased the modification books. We often ask them why they are modifying their radios. They tell us they are amateur radio operators who need to monitor frequencies outside the amateur band for work purposes.

While we were preparing this new edition, we received a phone call from a fellow at the FCC. Since the FCC has ordered copies of the modification books in the past, we were not surprised. We asked him why the FCC purchases the books. He told us they use the books to check confiscated radios to see if they have been modified.

Most amateur radio operators have used one of the editions to modify their amateur radio or scanner.

We receive calls all the time from people asking how we get the modifications we present in the books. Basically, they come from amateur radio operators around the world. We receive modifications with detailed drawings and instructions.

Introduction

THERE ARE 2 BOOKS IN THIS EDITION SET. AN ORDER FORM FOR THE OTHER BOOK IS AVAILABLE IN THE BACK OF THIS BOOK.

The newest versions of RADIO/TECH MODIFICATIONS are Edition 14, part A (14A) Edition 14, part B (14B). Edition 14A contains all known modifications for ICOM and Kenwood Radios and mods for the popular scanners. Edition 14B has all the modifications for Yeasu, Alinco, Standard, Azden, KDK, Ten Tec, Ranger, Uniden, Radio Shack and popular CB radios.

During the past 11 years we have created 14 Editions of Radio/Tech modifications. Each new edition included the information contained in the previous editions. So if you have the current edition, you do not need to purchase the previous ones.

We make every effort to improve the illustrations with each new edition. The modifications presented here have been performed by many people throughout the world. Unless the manufacturer changes the radio in some significant way, the modifications contained in this book are accurate and current.

We make every effort to provide all available modifications for every radio we can find. In some cases, additional information is available for a radio that can not be presented in the book. We try and keep this information on file and will provide it to verified owners of the current edition for a small fee. We also try to keep the cost of the modification books as low as possible. We ask that you do not photocopy pages from these books. We will support you however we can, however, if you call us we will ask that you have the book in your hands at the time of the call.

It was only logical that we start to include the alignment points for each of the radios. Since you are inside them performing the modification, it is a good time to adjust the Modulation and Power levels.

Phone Support and New Modifications

If you find a new radio is not listed in these pages, contact us and ask about it. We may have a copy that did not make the printing deadline. If you purchased the current book and have sent in the proof of purchase/update request form, we can send the new modification to you.

We produce new editions of this book every year If you have the most current edition, we will mail or FAX you any requested modification we may have available when you send in the form in the back of the book. You **MUST** send in the proof of purchase/update form in the back of this book to receive phone or mail support.

Once we have a new edition available, you must purchase it before we can continue support on any new or revised modifications.

Your comments and suggestions are always welcome. If the modification works great, let us know. If you can't make the modification work, let us know. We can't test every modification, we don't have all the radios. Your help will make the next volumes better for everyone.

A good percentage of our modifications come from people just like you. They may discover the modification themselves or talked someone into sending a copy of the manufacturers modification sheet.

When you help us find or improve a modification, we often say thank you with no charge copies of our books. Let's work together to create a high quality book that everyone can use.

Scanner Modification Problems

In 1993 the FCC created some new rules about scanners and the frequencies they may receive. (SEE the section Modifications and the law, below)

The Manufactures were forced to modify all versions of their scanners to comply with the new law. The modifications that worked on the old versions no longer work on the new versions.

Most of the modification presented here work on the older versions but not on the new ones. We have found some of the new modifications and have presented them in this book. As more become available, we will include them in future editions.

We expect that the manufactures have a modification available for the new versions, but are not releasing it to anyone. If they locked out any modification, they will only be hurting their own future sales.

If you have a problem with a modification, let us know and we will make any new information available to you.

If you purchased one of these scanners, write a letter to the manufacturer and express your personal dissatisfaction. If they get enough letters and complaints they may think twice before limiting their products in the future.

If you need a scanner that can be modified, contact a dealer in another country like Canada and purchase one there. It may cost you a bit more.

Your other option is to purchase an amateur radio receiver. These receivers will be more expensive, but will outperform any other retail scanners.

Modifications and the law

Cellular Phone Bands

The Federal Communications Commission (FCC) is the agency in charge of controlling the airwaves in the United States. It has been their responsibility to oversee the content of the transmissions from broadcasters in the United States. On April 26, 1993, the FCC decided that they should not only control what information is broadcast on the airwaves, they should also control the sale of radios capable of receiving certain frequencies.

The issue in this decision is protecting the privacy of cellular phone users. The Cellular phone frequency band in the upper 800 MHz range has become a favorite scanner listening band. The cellular users deserve their privacy. Hence, the FCC has declared a ban on all scanner style radios or converters capable of receiving the cellular band.

The wording of the new law is intended to regulate what type of receivers may be sold in the United States.

Section 15.121 Scanning receivers and frequency converters designed or marketed for use with scanning receivers.

(a) Except as provided in paragraph (b), scanning receivers, and frequencies converters designed or marketed for use with scanning receivers, must be incapable of operating (tuning), or readily being altered by the user to operate, within the frequency bands allocated to the domestic Public Cellular Radio Telecommunications Service in part 22 of this chapter (cellular telephone bands). Receivers capable of "readily being altered by the user: include, but are not limited to, those for which the ability to receive transmissions in the cellular telephone bands can be added by clipping the leads of, or installing, a simple component such as a diode, resistor and/or jumper wire;

replacing a plug-in semiconductor chip; or programming a semiconductor chip using special access codes or an external device, such as a personal computer. Scanning receivers, and frequencies converters designed or marketed for use with scanning receivers, must also be incapable of converting digital cellular transmissions to analog voice audio.

(b) Scanning receivers, and frequency converters designed or marketed for use with scanning receivers, that are manufactured exclusively for, and marketed exclusively to, entities described in 18 U.S.C. Section 2512 (2) are not subject to the requirements of paragraph (a).

It seems apparent that the FCC is attempting to protect the cellular phone users' privacy. The Cellular industry is also taking reasonable precautions to protect their users with their new digital technology. Perhaps after digital takes over, the FCC will relax or repeal the rule.

Transmitting out of band

The Federal Communications Commission (FCC) has another set of rules that controls the type of transceivers approved for use in the United States. The purpose is to make sure that transmissions are clean and do not cause interference or emissions on other frequencies.

The FCC has special relaxed rules for Amateur equipment that help to encourage lower pricing for transceivers. The FCC will approve a radio for use only in the Amateur frequency range, but the same radio may be refused for use in the Business band.

Use of a Amateur approved radio to transmit outside the amateur band is illegal no matter what type of license you have, (MARS & CAP do have a permission to exceed the limits by 3-4 MHz).

No discussion about transmission on the Police bands is needed here. It is illegal and wrong and can cause loss of Human life. If you know of anyone doing it, turn them in.

Meet Our New Family of Mobile/Base Transceivers

Fantastic Features • Rugged • Good Looking • Superior Alinco Value!

Each member of our new "family" includes:

- 100 memory channels
- Large alphanumeric display
- CTCSS and DCS encode+decode, DTMF encode and European Tone Bursts
- Large, comfortable backlit mic
- Ten autodial memories
- Accepts optional EJ-41U internal 1200/9600 TNC
- Rear panel DSUB9 serial connector for packet operation
- Front panel input for GPS/APRS® operations
- Ignition key on/off feature
- Theft alarm feature
- Multiple scan modes including CTCSS and DCS
- Available with classic black(T) or pewter(TG) colored chassis
- Narrow FM operation feature
- 1200/9600 bps capability with internal or external TNC
- Wire clone feature

DR-135T/TP/TG/TPG 2 Meter FM Transceiver

Additional features include:

- 144 ~ 148 MHz TX/RX
- AM Airband RX (118 ~ 136 MHz)
- Extended Receive 136 ~ 174 MHz (FM)
- MARS capability
- 50/10/5 watt power output settings
- Available with or without internal 1200/9600 TNC TP and TPG include factory-installed TNC

By Popular Demand!

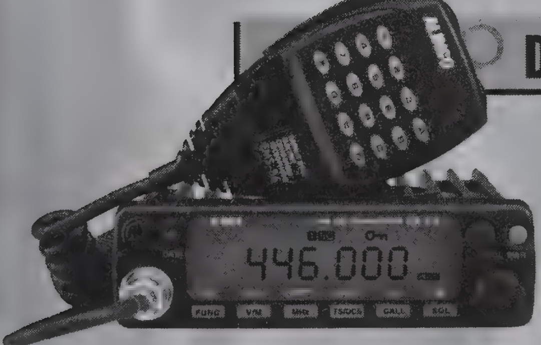
DR-235T/TG 222 MHz FM Transceiver

Additional features include:

- Amazing low price for 222 MHz
- 222 ~ 225 MHz TX/RX
- Extended receive 216 ~ 280 MHz (FM)
- 219 ~ 220 MHz TX/RX capability (see FCC rules)
- MARS capability
- 25/10/5 watt power output settings
- Accepts optional EJ-41U 1200/9600 internal TNC

DR-435T/TG 440 MHz FM Transceiver

NEW!



Additional features include:

- 430 ~ 450 MHz TX/RX
- Extended receive 350 ~ 511 MHz (FM)
- All memories capable of odd splits
- 35/10/5 watt power output settings
- Accepts optional EJ-41U 1200/9600 internal TNC

www.**ALINCO**®.com

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Performance specifications only apply to amateur bands. APRS is a registered trademark of Bob Bruninga, WB4APR.

Surface Mount Components

Many of the modifications presented in this text require you to remove or install surface mount components.

Surface mount components come in various configurations, starting with large microprocessors all the way down to single diode packages. You will even find that single diodes and resistors come in different sizes.

Some of these modifications use very small packages with three leads. About a year ago I ordered 50 of a popular package and accidentally dropped them on the carpet, I lost 20 of them because I couldn't find them!!

You will find that with a little care and the proper tools, you will be able to remove or install the components without causing any other problems.

I suggest solder wick as the best method to remove the solder, some people prefer a solder sucker. I find that many people over heat the components and board using a solder sucker. This is of course assuming that you do not have access to a desoldering station ($3,000 plus).

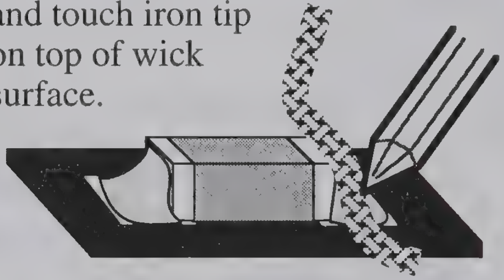
As solder melts and is drawn onto the wick, move the wick to expose a new clean section of th wick. This insures the maximum solder is removed from the board.

Don't be afraid to use lots of solder wick when removing the solder. Clean wick will speed up the process. You don't want to over heat the component while you remove the solder.

Exercise a additional caution to insure that you do not overheat the circuit board. Damaging the circuit board is the most expensive accident you can have.

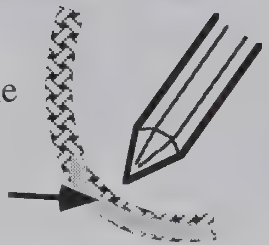
Removing

Place solder wick on solder pad and touch iron tip on top of wick surface.

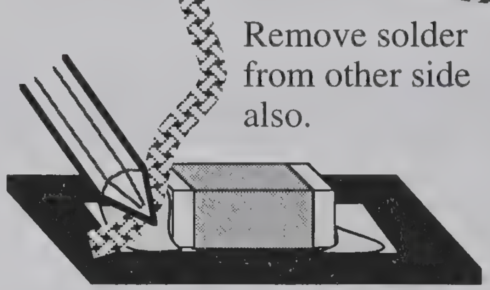


Use clean wick surface every time

Solder should flow off board onto wick.

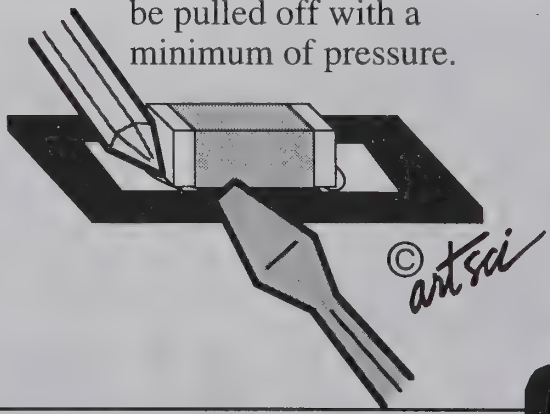


Remove solder from other side also.



You may need to alternate sides 2-5 times to remove 95% of the solder.

After the solder has been removed the component can be pulled off with a minimum of pressure.



Excess heat can lift the circuit board traces right off the board. A small section might stick to the soldering iron and you might not notice until you discover the radio won't work.

Caution must be taken to protect the component also (if you will need it again). Remove a little solder and move to the other side of the component. After 2-5 times the part will pop off!!

Be careful you do not lose the part when you remove it. It may stick to the solder wick or even stay attached to the iron itself.

Make a note of the numbers on the part being removed. You may need to order a replacement part.

Installing

Installing components is easier than removing them. Excess heat during installation should also be avoided.

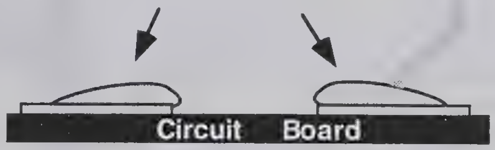
Place a small amount of solder on the circuit board pads before you attempt to install the component. This will allow you to place the part in position and use the iron to melt the solder and it will attach the component in place.

Remember to hold the component in place using a blunt tool or screwdriver. Small surface mount components seem to jump right off the board and glue themselves to a soldering iron.

To test if a component is properly attached, use a volt/ohmmeter. Attach one lead to the trace on the circuit board and the other lead to the exposed component lead, and make sure that continuity is present.

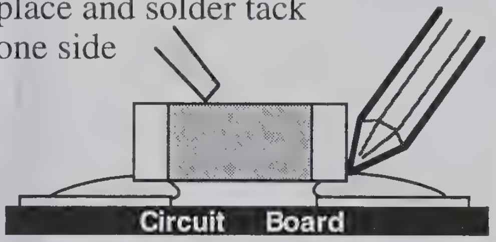
Installing

Place a small amount of solder on the installation pads



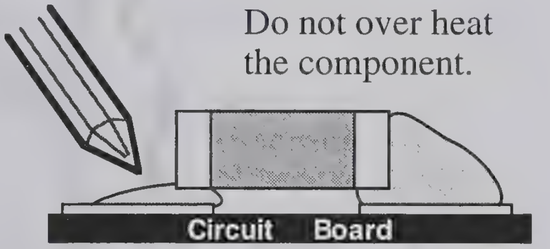
Place the component on the board

Hold the component in place and solder tack one side



Solder both sides.

Do not over heat the component.



Solder should be smooth and fully bonded to the component

- Some technicians perfer to use a solder sucker to remove solder.
- Components can be damaged by excess heat.
- Components may adhere themselves to the tip of the soldering iron if not held in place.

Chip Diode Package Layouts

Many of the modifications presented in this text require you to remove or install surface mount components.

Some of these modifications use very small packages with three leads. About a year ago I ordered 50 of a popular package and accidentally dropped them on the carpet, I lost 20 of them because I couldn't find them!!

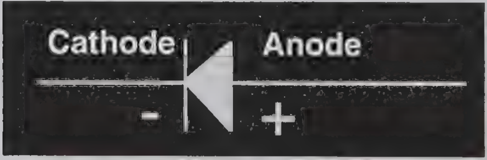
Actual Size of a Chip Diode Package

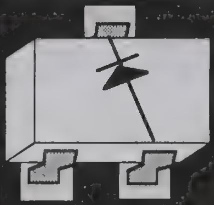
These components are available directly from the radio manufacturers' parts department.

Some experienced technicians may elect to use separate 1N914 diodes in place of these diode packages.

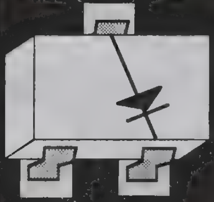
The only problem with using 1N914 diodes is that they are 3-4 times larger than the diode package, and may not fit properly.

However, here are the diode package layouts for the popular packages.

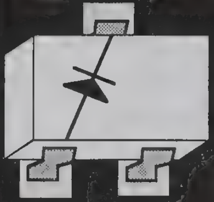




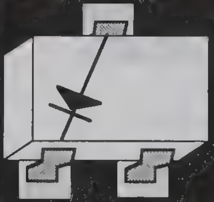
DA115 (symbol: AU)
1SS196 (symbol: G3)



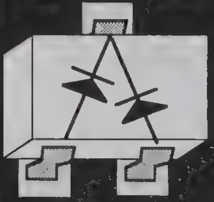
1SS190 (Symbol: E3)



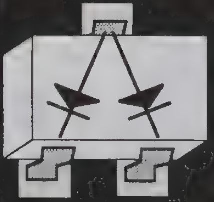
DA114
1SS193 (symbol: F3)



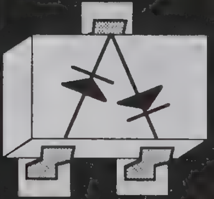
1SS187 (Symbol: D3)



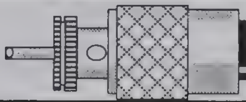
MA132WK (symbol: MU)
1SS184 (symbol: B3)
DAN202U (symbol: N)



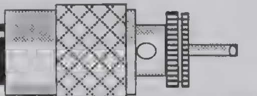
1SS181 (symbol: A3)



DA133 (symbol: MP)
DA204U



Radio	Modification	Page #
ALD-24T	Expanded RF/Alignment Controls	Alinco - 3
ALR-22	Expanded RF/Alignment Controls	Alinco - 3
DJ-100	Expanded RF/Alignment Controls	Alinco - 4
DJ-120	Expanded RF/Alignment Controls	Alinco - 4
DJ-160	Expanded RF/Alignment Controls	Alinco - 5
DJ-162	Expanded RF/Alignment Controls	Alinco - 5
DJ-180	Expanded RF/Alignment Controls	Alinco - 6
DJ-190	Expanded RF	Alinco - 7
DJ-191	Expanded RF	Alinco - 8
DJ-195	Expanded RF/Alignment Controls	Alinco - 9
DJ-196	Expanded RF/Alignment Controls	Alinco - 19
DJ-280	Expanded RF/Alignment Controls	Alinco - 10
DJ-460	Expanded RF/Alignment Controls	Alinco - 12
DJ-500	Expanded RF/Alignment Controls	Alinco - 13
DJ-560	Expanded RF/Alignment Controls	Alinco - 14
DJ-580	Expanded RF/Alignment Controls	Alinco - 15
DJ-582	Expanded RF/Alignment Controls	Alinco - 15
DJ-C1	Expanded RF	Alinco - 16
DJ-C4	Expanded RF	Alinco - 16
DJ-C5	Expanded RF/Alignment Controls	Alinco - 17
DJ-F1T	Expanded RF/Alignment Controls	Alinco - 18
DJ-G1T	Expanded RF	Alinco - 19
DJ-G5T	Expanded RF	Alinco - 20
DJ-S11T	Expanded RF	Alinco - 21
DJ-S41T	Expanded RF	Alinco - 21
DJ-V5T	Expanded RF	Alinco - 22
DR-110T	Expanded RF	Alinco - 24
DR-112T	Expanded RF	Alinco - 24
DR-119T	Expanded RF	Alinco - 24
DR-130	Expanded RF	Alinco - 25
DR-140	Expanded RF	Alinco - 25
DR-150	Expanded RF/Alignment Controls	Alinco - 26
DR-430	Expanded RF	Alinco - 25
DR-510	Expanded RF/Alignment Controls	Alinco - 27
DR-570	Expanded RF/Alignment Controls	Alinco - 28
DR-590	Expanded RF/Alignment Controls	Alinco - 29
DR-592	Expanded RF/Alignment Controls	Alinco - 29
DR-599	Expanded RF/Alignment Controls	Alinco - 30
DR-600	Expanded RF	Alinco - 31
DR-605	Expanded RF	Alinco - 33
DR-610	Expanded RF/Alignment Controls	Alinco - 34
DR-1200	Alignment Controls	Alinco - 35
DR-M03	Expanded RF/Alignment Controls	Alinco - 36
DR-M06	Expanded RF/Alignment Controls	Alinco - 36
DX-70	Expanded RF	Alinco - 37
DX-77	Expanded RF	Alinco - 38
PACKET	Connector pin outs	Alinco - 40

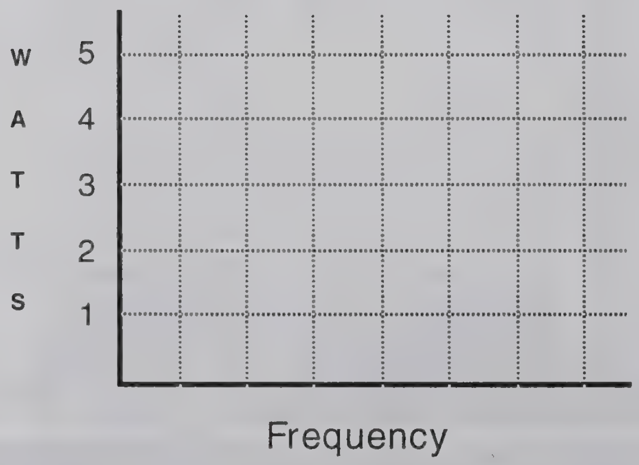


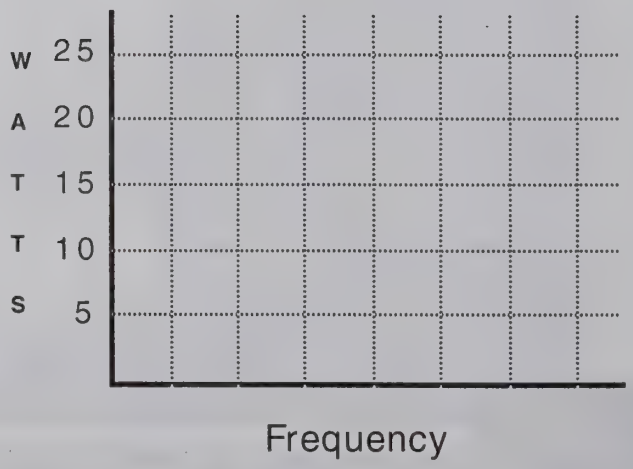
Performance Report

Radio ______________________ Date ____________

Owner : Name ______________________________
Address ______________________________
City ______________ St. Zip ______________
Phone ( ) -

Description	Before	After
Power out (Low)	________ Watts	________ Watts
Power out (High)	________ Watts	________ Watts
Frequency Error (Simplex)	________ Hz	________ Hz
Frequency Error (Offset)	________ Hz	________ Hz
Receive Sensitivity (Mid-band)	________ uv	________ uv
Receive Sensitivity (_____MHz)	________ uv	________ uv
Receive Sensitivity (_____MHz)	________ uv	________ uv
PL Deviation	________ Hz	________ Hz
DTMF Deviation	________ KHz	________ KHz
Audio Deviation	________ KHz	________ KHz
Lowest usable Freq @ .5 Pwr	________ MHz	________ MHz
Highest usable Freq @ .5 Pwr	________ MHz	________ MHz



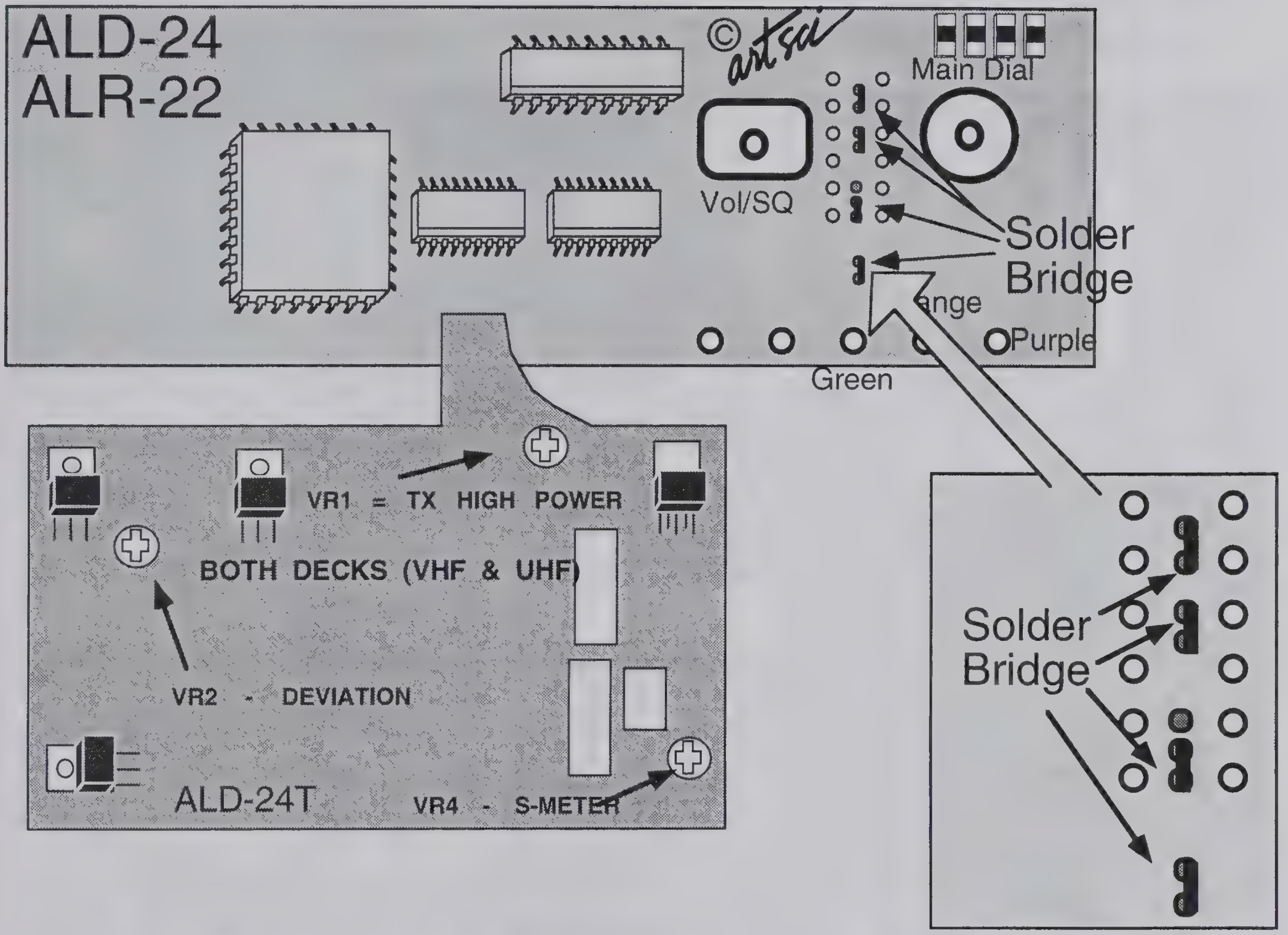


Receive and Transmit Expansion

Alinco ALD-24
Alinco ALR-22

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Modification Instructions

1. Remove Battery and Antenna.
2. Remove top and bottom covers.
3. Remove Main dial, Vol & SQL knobs. Remove the retaining rings.
4. Remove front cover to access front panel circuit board.
5. **Solder bridge four sets of pads as shown.**
6. Reassemble radio.
7. Reset microprocessor (Press reset button)

Expansion Range

Not all versions will get full expansion

138 - 165 MHz TX/RX
420 - 469 MHz TX/RX

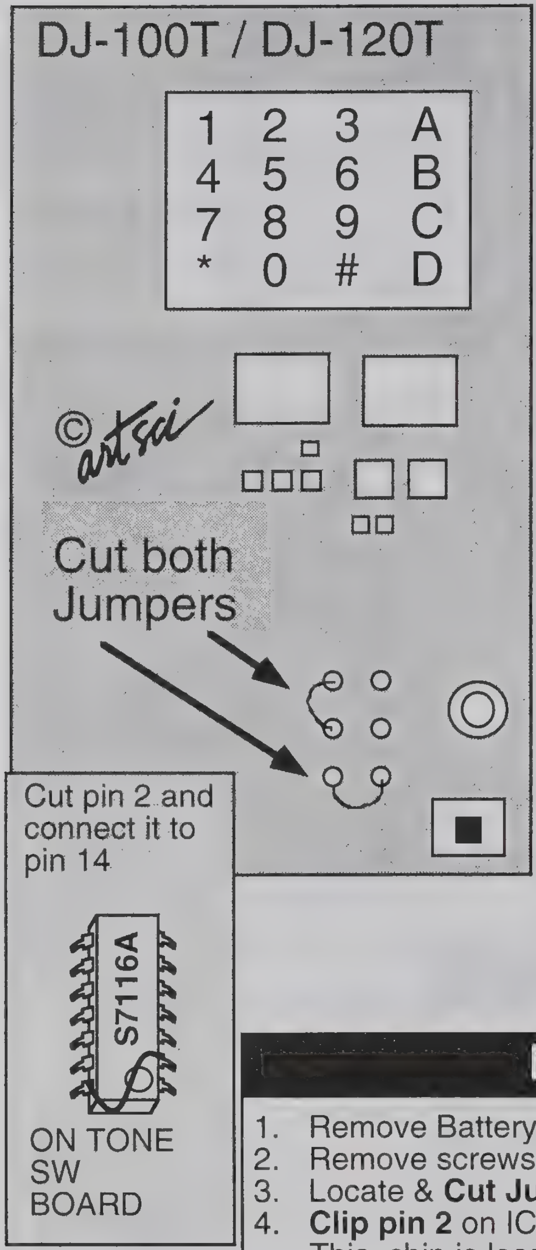
Alinco DJ-100T
DJ-120T

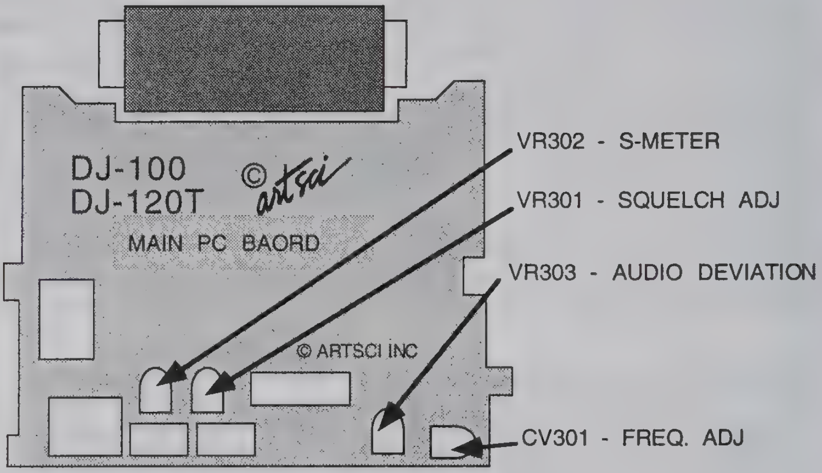
Receive and Transmit Expansion

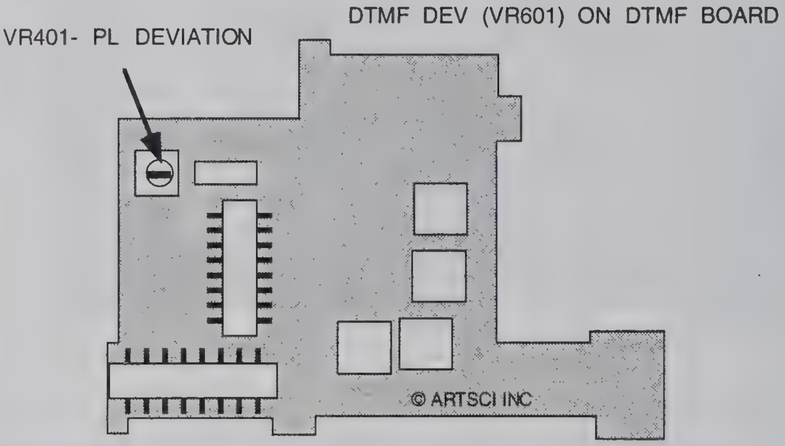
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION: Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
138 - 165 MHz







Modification Instructions

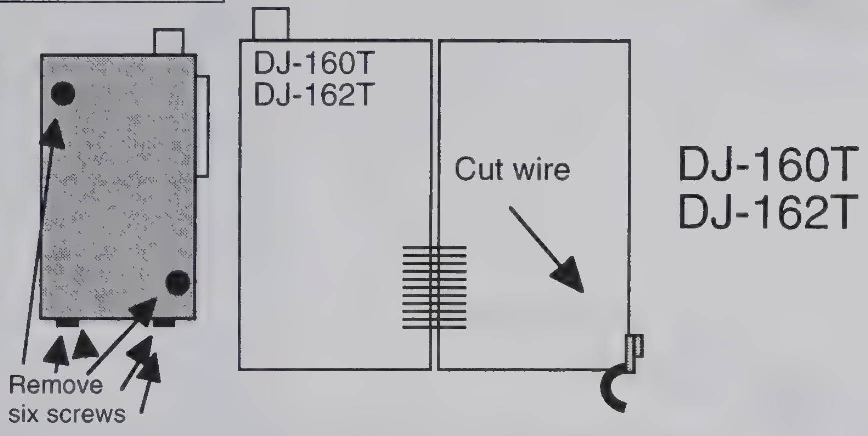
1. Remove Battery and Antenna.
2. Remove screws from case and open radio.
3. Locate & **Cut Jumpers per drawing.**
4. **Clip pin 2** on IC401(S7116A) and connect it to pin 14 (for simplex PL tone) This chip is located on the TONE SW board.
4. Reassemble radio.
5. Reset the Micro Processor.

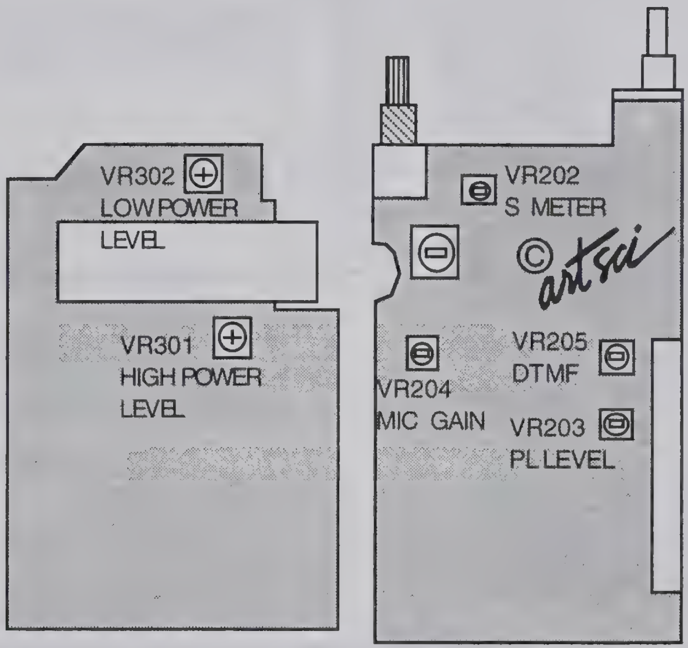
Receive and Transmit Expansion Alinco DJ-160T/162T

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
138 - 165 MHz





Modification Instructions

1. Remove Battery and Antenna.
2. Remove 2 screws back of case and four screws from battery slide clip.
3. Remove Main dial, Vol & SQL knobs. Remove the retaining rings.
4. Remove the top cover.
5. Open radio.
6. Locate and **cut yellow wire** behind the battery release button.
7. Reassemble radio.
8. **Reset microprocessor.** (Press and hold [F] key and turn power on.)

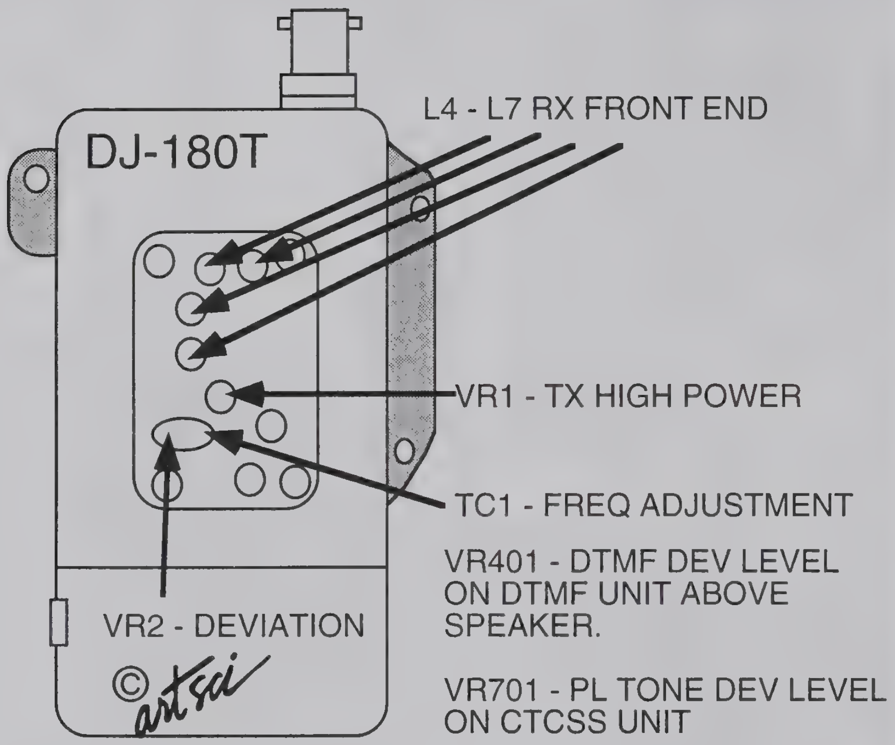
DJ-162 AM Mode RX: In VFO Press [B]

Alinco DJ-180T Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
138 - 165 MHz



Modification Instructions

1. Remove Battery and Antenna.
2. Remove the four screws holding the battery slide plate in location.
   (Careful not to break the battery plate wires)
3. Locate and **cut the "PINK" wire**. (Only the PINK wire)
4. Reassemble the unit.
5. **Reset the microprocessor**
   (Press and hold the [FUNC] & [LAMP] button and turn the power on.)

Optional Receive only mod: (130 - 173 MHz)

1. Reset the microprocessor
   (Press and hold the [LAMP] button and turn the power on.)

Receive and Transmit Expansion — Alinco DJ-190T

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

138 - 165 MHz

420 - 469 MHz

Modification Instructions

1. Remove battery and antenna.
2. Remove the Plastic dial knob and rubber base.
3. Remove speaker/mic rubber cover
4. Remove the four screws from the rear of the radio
5. Carefully seperate the radio in half
6. Unplug the speaker from the CPU board
7. Remove the four screws on the CPU board and the two screws on the PYYU board
8. Carefully fan out the CPU board to expose the rear of the board where the CPU is located
9. Locate and cut the BLUE wire loop located at the upper right of the CPU
10. Reassemble the radio.
11. Reset the CPU
    (Hold the [FUNCTION] key while turning the radio on)

Alinco DJ-191T

Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

138 - 165 MHz

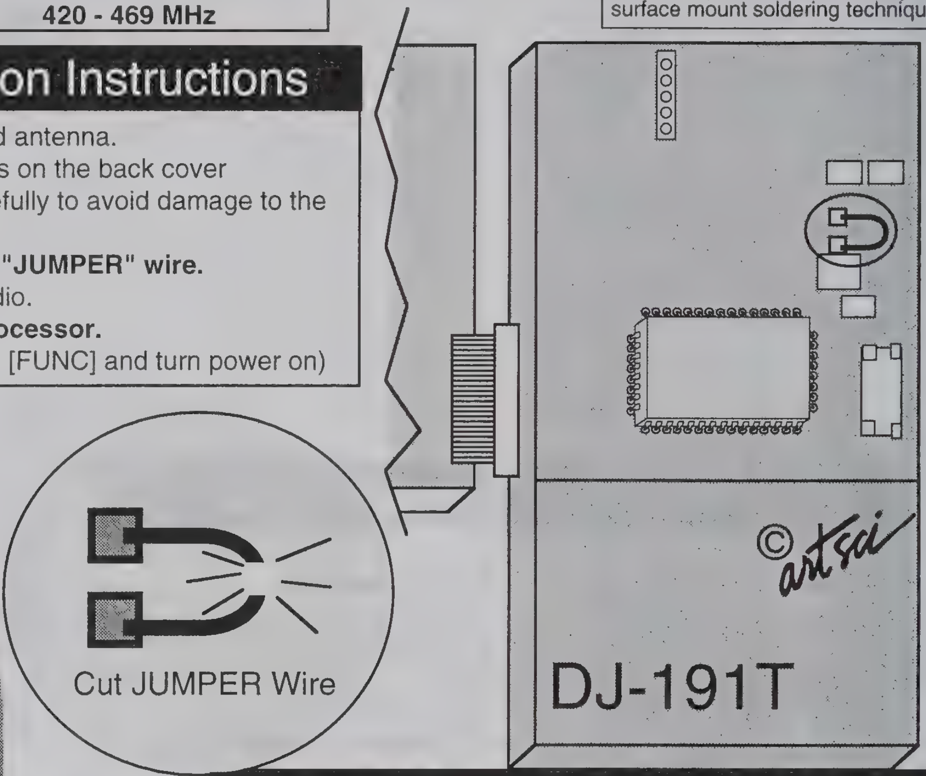
420 - 469 MHz

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Modification Instructions

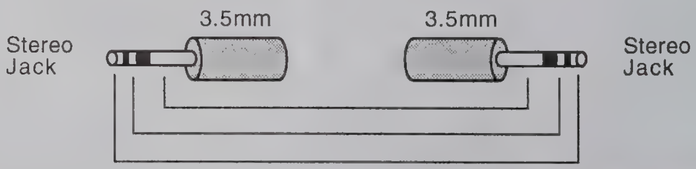
1. Remove battery and antenna.
2. Remove four screws on the back cover
3. Open the radio carefully to avoid damage to the ribbon cable.
4. Locate and **cut the "JUMPER" wire.**
5. Reassemble the radio.
6. **Reset the microprocessor.**
   (Press and hold [FUNC] and turn power on)



Cable Cloning

The entire memory and VFO contents may be copies from one DJ-191T to another DJ-191T.

1. Connect speaker jacks together using an interface cable.
2. Turn on both radios.
3. Press and hold [MONI] and press the [PTT] key three times on both radios. ("CLONE will appear)
4. Press [MONI] on the slave radio. (the one that gets the information and "READY": will appear)
5. Press [PTT} on the master radio.
   ("PUSH" will appear on the display.)
6. Press [PTT] again to start the copy.
7. "END" will appear when the task is complete.
8. Turn off both radios.
9. Remove the cable.



Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

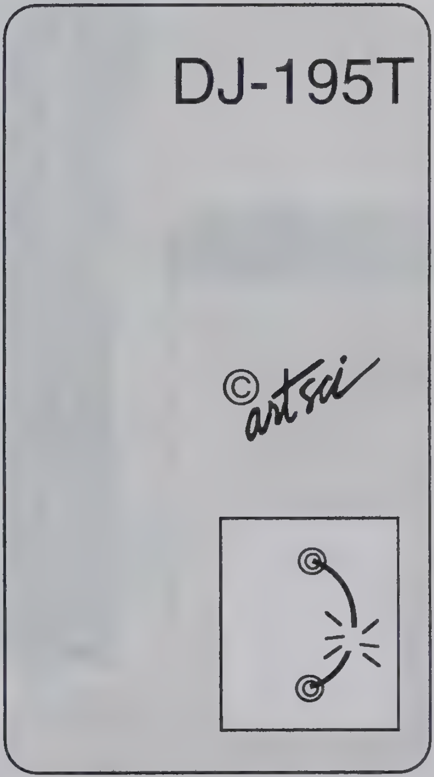
Expansion Range

Not all versions will get full expansion

136- 174 MHz

Modification Instructions

1. Remove battery and antenna.
2. Remove the Plastic cover.
3. Locate and cut Blue Loop Wire.
4. Reassemble the radio.
5. Reset the CPU
   (Hold the [F] key while turning the radio on)



Alinco DJ-280T Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

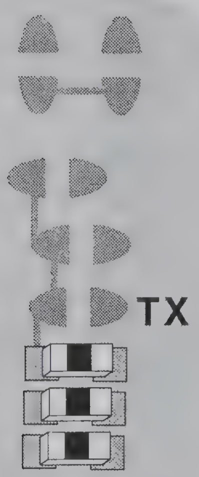
Expansion Range

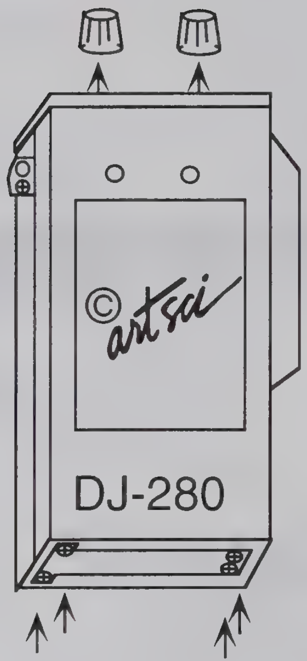
Not all versions will get full expansion

Unknown

CAUTION:

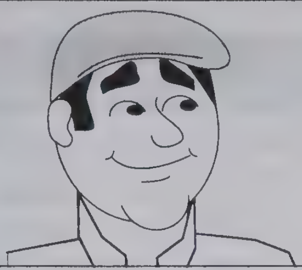
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.





Modification Instructions

1. Remove Battery and Antenna.
2. Remove 4 screws from bottom battery slide clip and 3 case screws.
3. Remove knobs. Gently slide front case over knob holes.
4. Remove the DTMF pad wire plug and speaker plug.
5. Locate and **unsolder the pad marked "TX".**
6. Locate and **cut the RED loop wire** on bottom of radio next to channel expansion unit.
7. Reassemble radio.
8. **Reset microprocessor.**
   (Press and hold [F] and [LAMP] keys and turn power on.



BOB Simpleton's Guide to PL Decoding/ speaker Muting

It is sometimes useful to keep your radio on at all times while waiting for an important call. However the chatter of other users may become a problem.

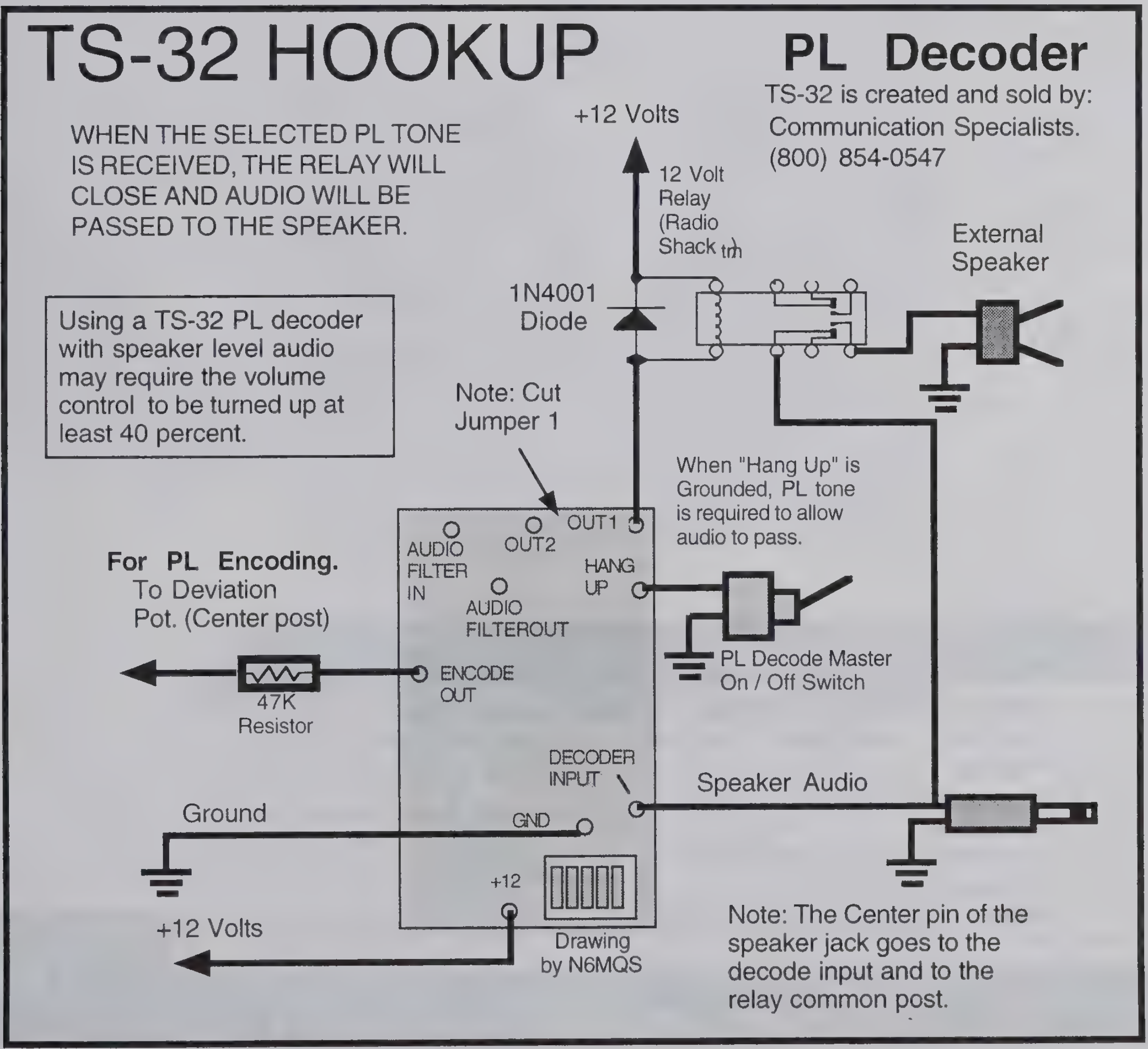
My good friend Bill likes to have his wife Jan monitor the base radio at home. During high radio traffic times, she will turn the volume down to avoid listening to others. It is then to low for her to hear Bill when he calls.

Bill put together this simple PL decoder circuit and attached it to his base radio. Now the radio speaker is disconnected unless the proper subaudable PL tone is used. Bill always transmits the correct PL tone when he wants to talk to Jan at home. He keeps the base radio volume very high so Jan can hear him calling from almost anywhere in the house.

His circuit was created using the popular TS-32 PL Decoder by Communication Specialists. Most repeater systems use this decoder because it is very reliable and simple to use.

He has included a defeat switch to remove the PL requirement when using the radio for normal two-way communications. The TS-32 PL Decoder board has a special "HANG UP" pin that is grounded through the switch and will keep the relay triggered and all audio will pass to the speaker.

Bill suggested using the other side of the relay to activate a horn, buzzer or light of some kind. I built one of these circuits and used it in the car to flash a light when one of my friends call me. I see the light and turn the stereo down and answer the call. 73 and have some fun.


TS-32 HOOKUP
PL Decoder
TS-32 is created and sold by:
Communication Specialists.
(800) 854-0547
WHEN THE SELECTED PL TONE IS RECEIVED, THE RELAY WILL CLOSE AND AUDIO WILL BE PASSED TO THE SPEAKER.
+12 Volts
12 Volt Relay (Radio Shack tm)
External Speaker
1N4001 Diode
Using a TS-32 PL decoder with speaker level audio may require the volume control to be turned up at least 40 percent.
Note: Cut Jumper 1
When "Hang Up" is Grounded, PL tone is required to allow audio to pass.
OUT1
OUT2
AUDIO FILTER IN
AUDIO FILTEROUT
HANG UP
For PL Encoding.
To Deviation Pot. (Center post)
ENCODE OUT
47K Resistor
PL Decode Master On / Off Switch
DECODER INPUT
Speaker Audio
Ground
GND
+12
+12 Volts
Drawing by N6MQS
Note: The Center pin of the speaker jack goes to the decode input and to the relay common post.

Alinco DJ-460T Receive and Transmit Expansion

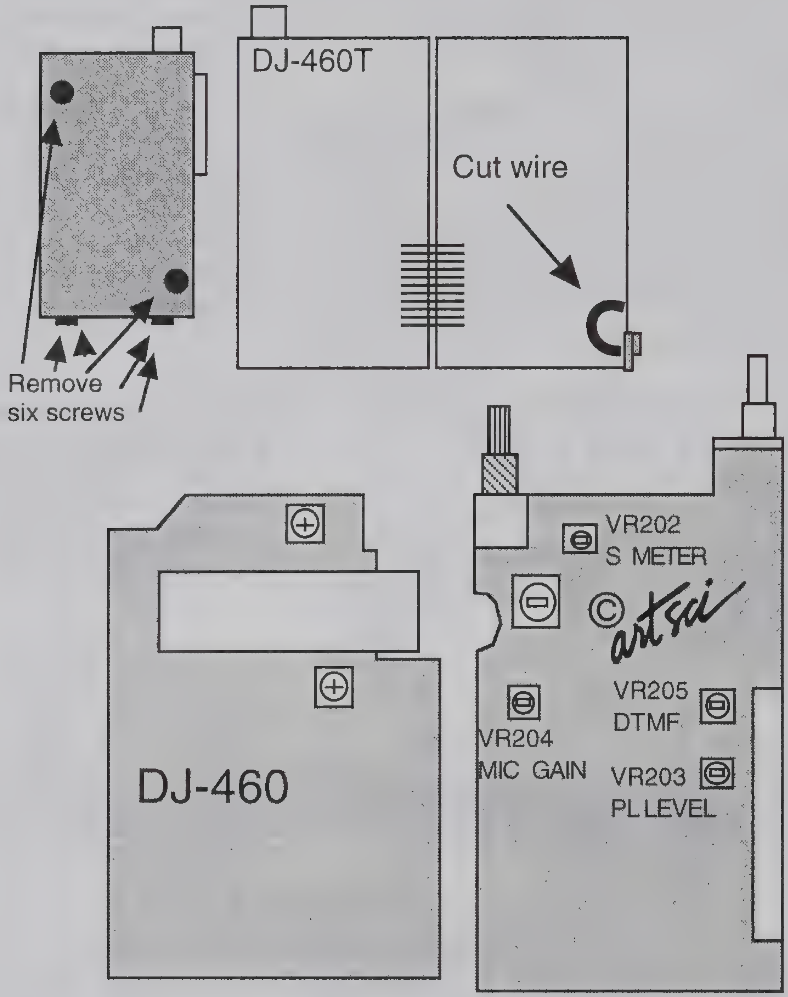
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

138 - 165 MHz
420 - 469 MHz



Modification Instructions

1. Remove Battery and Antenna.
2. Remove 2 screws back of case and four screws from battery slide clip.
3. Remove Main dial, Vol & SQL knobs. Remove the retaining rings.
4. Remove the top cover.
5. Open radio.
6. Locate and **cut wire behind the battery release button.**
7. Reassemble radio.
8. **Reset microprocessor.** (Press and hold [F] key and turn power on.

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Receive and Transmit Expansion

Alinco DJ-500T

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

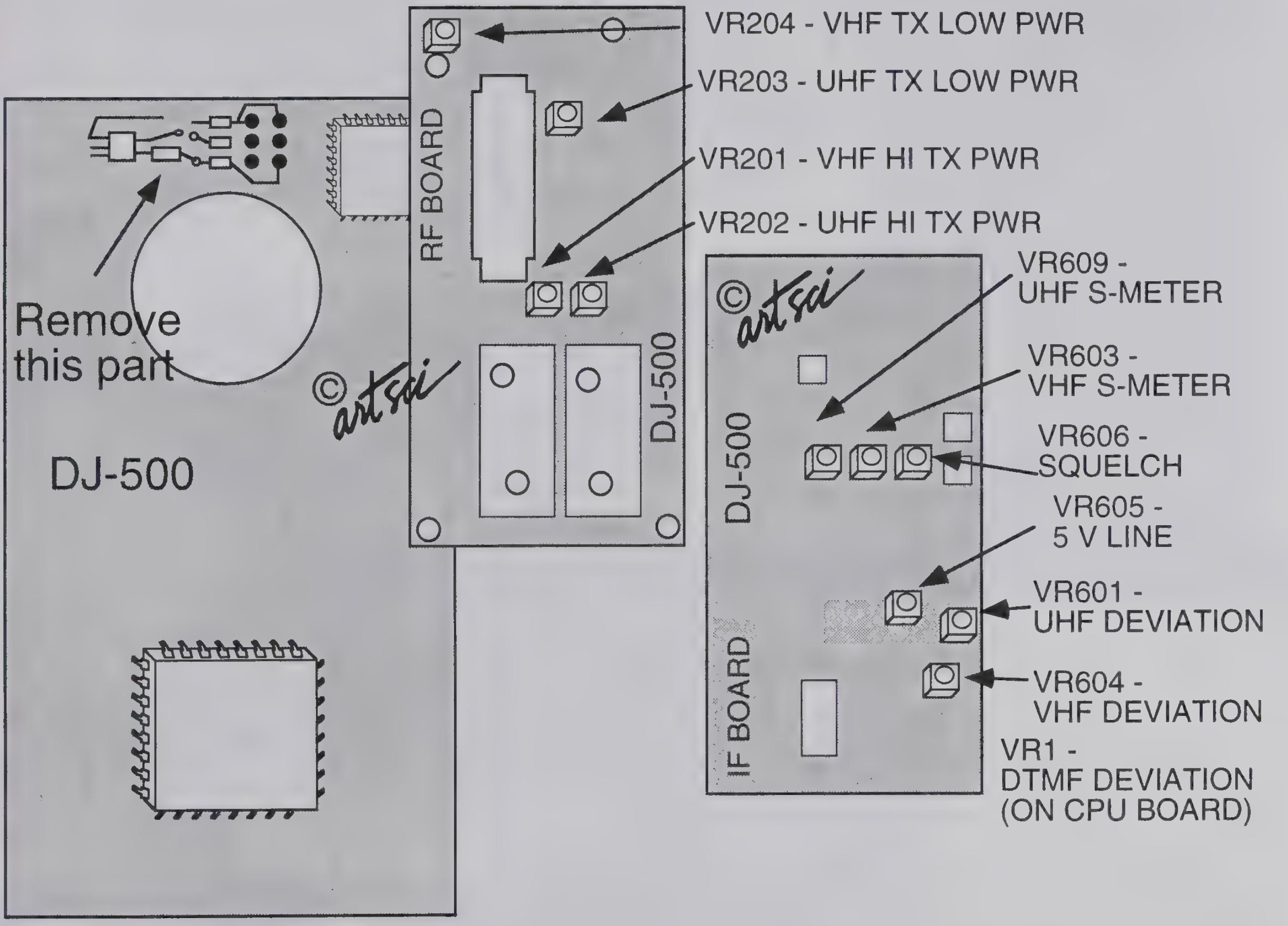
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

138 - 165 MHz

420 - 460 MHz



Modification Instructions

1. Remove Battery and Antenna.
2. Remove screws from case (3 Long & 2 short)
3. **Remove green component** per drawing.
4. Reassemble radio.
5. Reset the Microprocessor.
   (Reset switch is located below the PTT Switch)

Alinco DJ-560T Receive and Transmit Expansion

Expansion Range

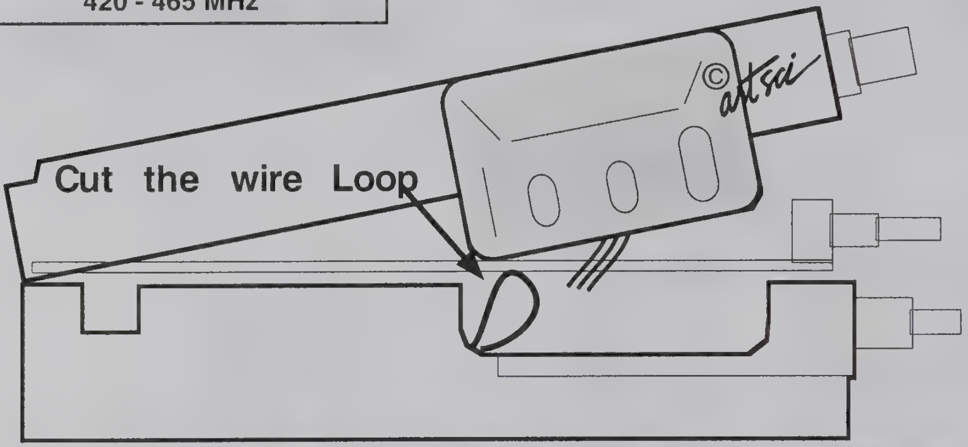
Not all versions will get full expansion

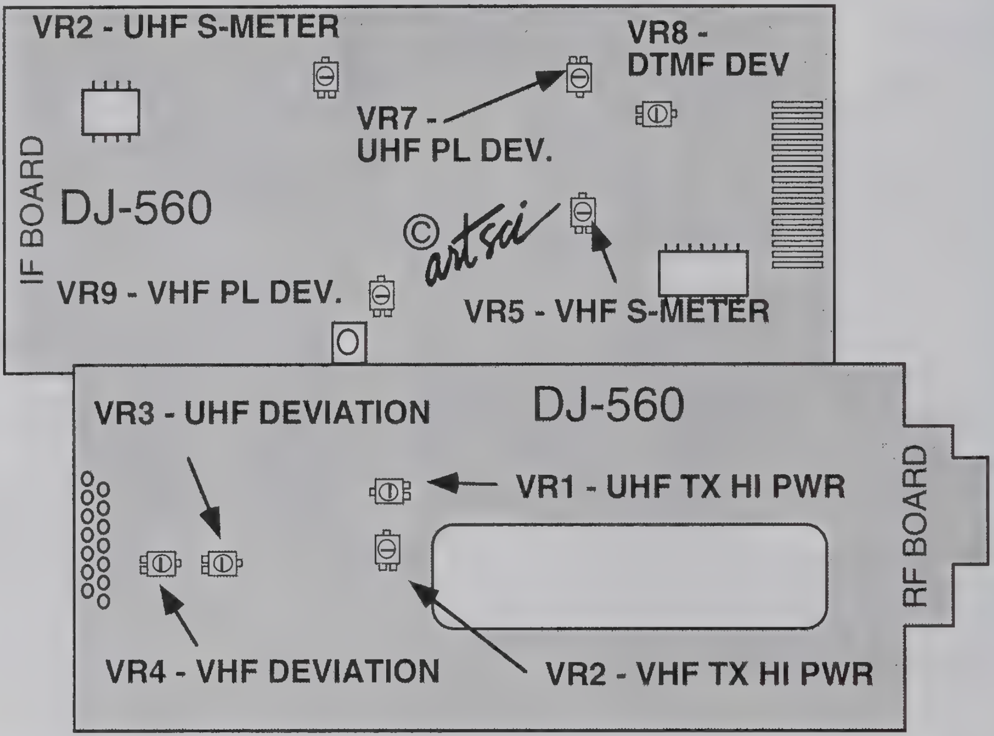
138 - 165 MHz
420 - 465 MHz

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.





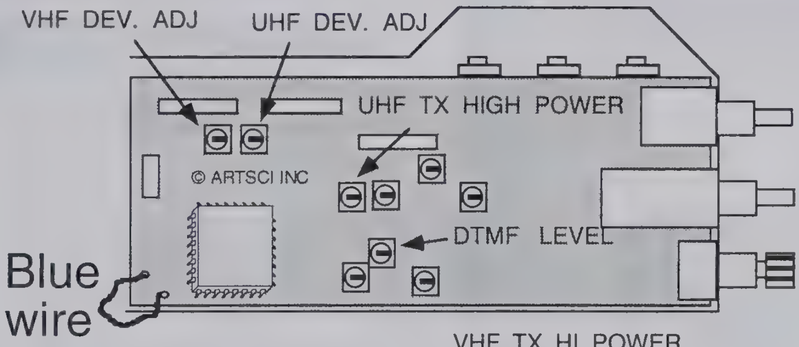
Modification Instructions

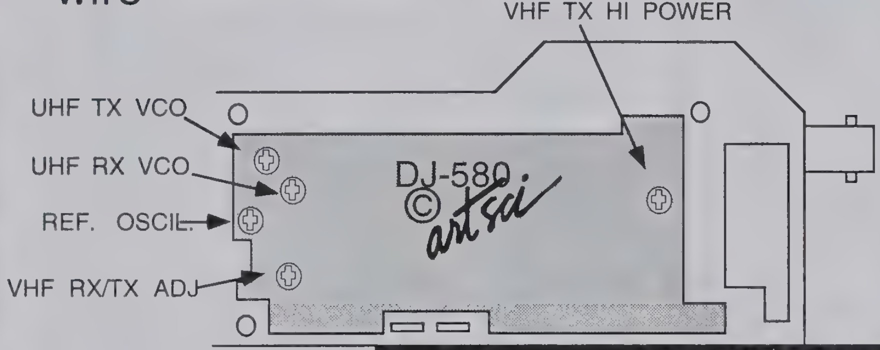
1. Remove battery and antenna.
2. Remove screws from back of case and.
3. Remove all 4 screws from battery plate.
4. Remove screw next to the BNC connector.
5. Remove the Dial, UHF and VHF knobs.
6. Unscrew the Lock rings under the Dial, UHF and VHF knobs.
7. Remove the top cover and the 4 screws holding the radio together.
4. Locate and **cut orange or Yellow wire** directly below the PTT switch.
5. Reassemble the radio.
6. **Reset the CPU**. (Press and hold [FUNCTION] and turn power on)

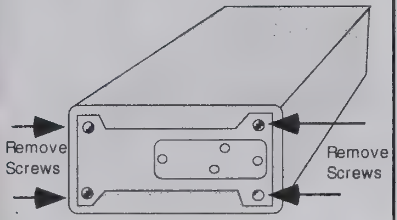
Receive and Transmit Expansion — Alinco DJ-580T/582T

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.







Modification Instructions

1. Remove battery and antenna.
2. Remove the four (4) screws on the bottom of the radio.
3. Remove the battery slide plate.
4. Locate and **CUT the BLUE wire** (for expanded RF)
5. Locate and **CUT the RED wire** (for aircraft and 800 MHz RX.
   DJ-582T Has no RED wire and no 800 MHz RX. Air band is standard)
6. Reassemble the radio.
7. **Reset the microprocessor.**
   (Press and hold the [FUNCTION] key and turn the radio on).

To Select the AIRCRAFT BAND
Press the [FUNCTION] and [VHF] key simultaneously.
The Letter "A" (AM mode) will appear on the display.
(press again to select the 2 meter band)

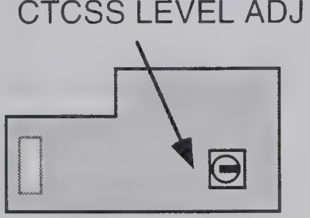
To Select the 800 MHz BAND (No 800 on DJ-582T)
Press the [FUNCTION] and [UHF] key simultaneously.
(press again to select the 440 MHz band)

Channel Display Mode (DJ-582T) Freq & PL can not be changed!!
Enter Frequency lock mode by pressing [FUNC] & [*].
Enter [#] [9] [8] [6] [3] [1] on the keypad
Press *741 to use VHF Channel display
Press *753 to use UHF Channel display.
Press *222 to unlock the main band
Press [*] [2] [8] [4] [D] [C] [A] to display the frequency
Press [FUNC] and [*] three times to exit Freq. lock mode.

Expansion Range

Not all versions will get full expansion

Air Band RX
800 MHz RX
130-175 MHz TX
410-475 MHz TX

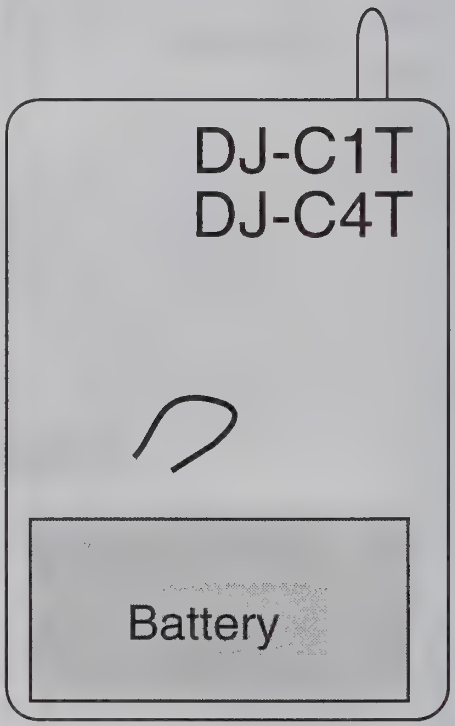


Alinco DJ-C1T/C4T Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
Unknown



Modification Instructions

1. Remove the Three rear case screws.
2. Carefully remove the rear case.

DJ-C1T: Locate and cut the BLUE wire Loop above the Lithium-ion battery.
DJ-C4T: Locate and cut the RED wire Loop above the Lithium-ion battery.

3. Reassemble the radio
4. Reset the microprocessor.
   (Press and hold [V/M] and [FUNCTION] buttons and turn the radio on)

Receive and Transmit Expansion

Alinco DJ-C5T

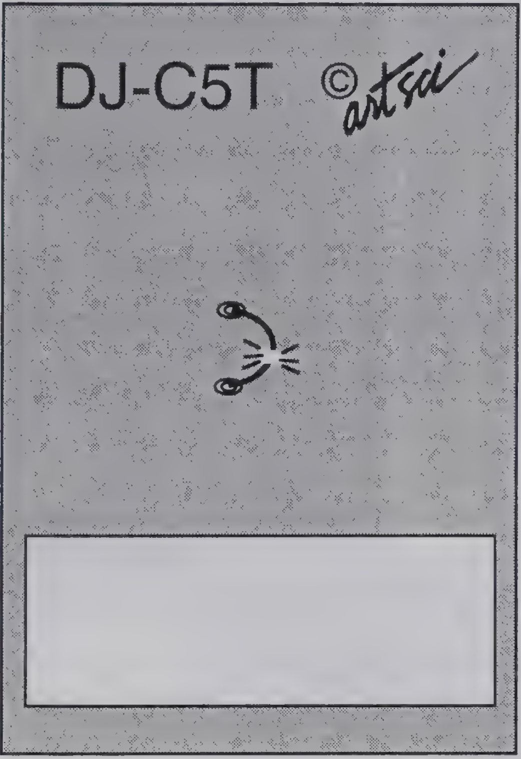
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

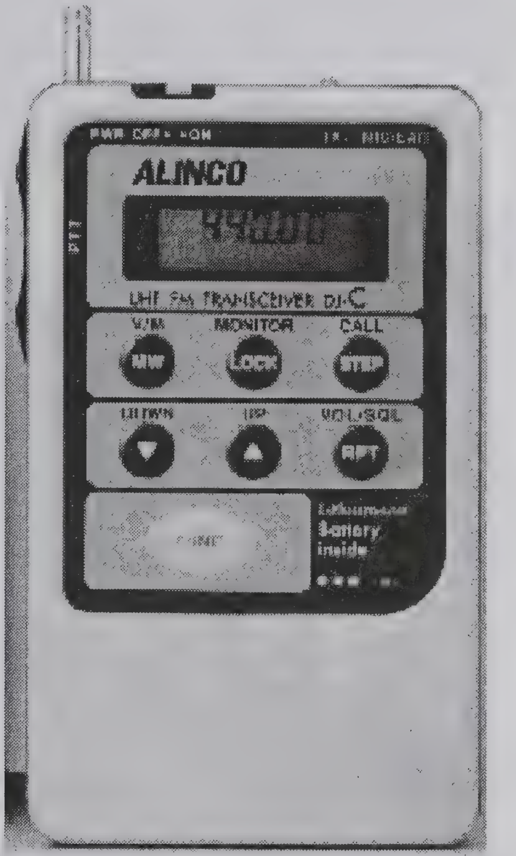
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

RX: 118 - 135.995 AM/AIR
TX/RX: 136 - 173.995 MHz NFM
TX/RX: 380 - 472.995 MHz NFM





Modification Instructions

1. Remove the Three rear case screws.
2. Carefully remove the rear case.
3. Locate and **cut the RED wire Loop** above the Lithium-ion battery.
4. Reassemble the radio
5. Reset the microprocessor.
   (Press and hold [MW] and [FUNCTION] buttons and turn the radio on)

Alinco DJ-F1T

Receive and Transmit Expansion

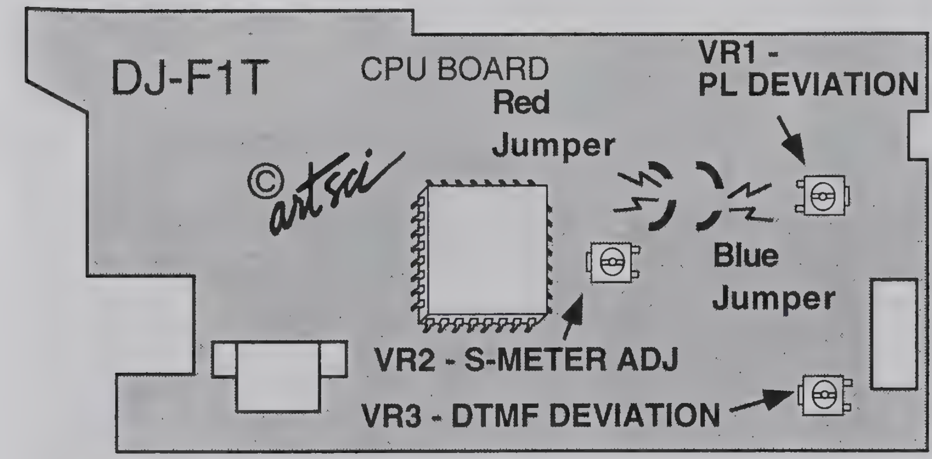
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

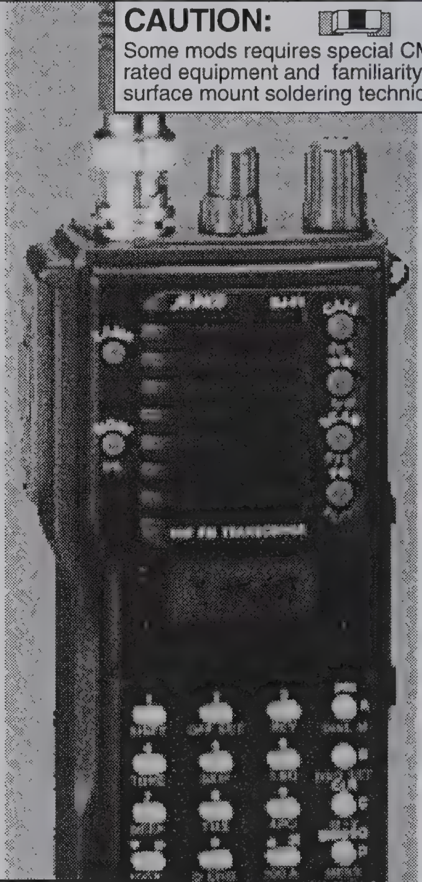
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

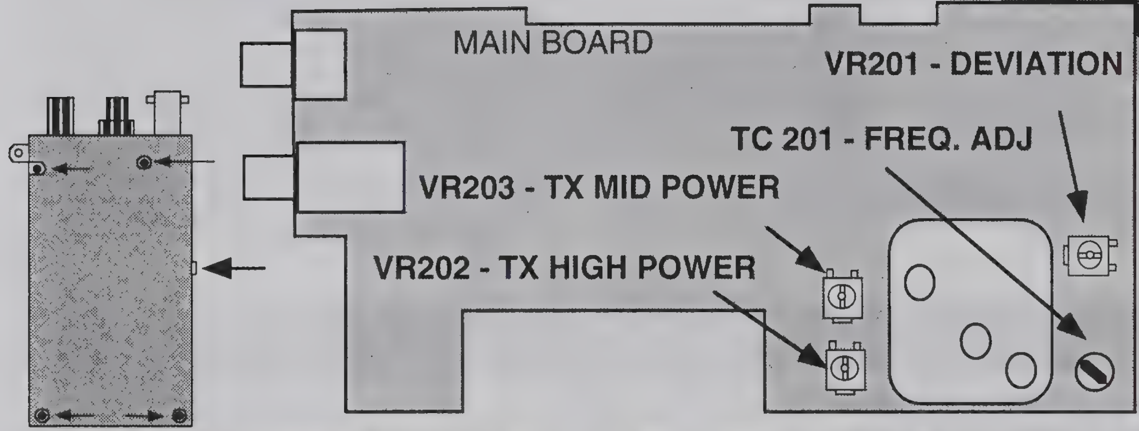
Expansion Range

Not all versions will get full expansion

138 - 165 MHz







Modification Instructions

1. Remove battery and antenna.
2. Remove 5 screws from the back of the case.
3. Slide and hold the Battery lock button open the radio carefully.
4. Locate and **cut the RED jumper wire.** (AM airband reception)
5. Locate and **cut the BLUE jumper.** (Expanded RF)
6. Reassemble the radio.
7. **Reset the microprocessor.** (Press and hold the [F] key and turn the power on)

TURN ON/OFF AIRBAND:

Press the [B] key. an "A" will appear on the display to indicate the AM mode is operating.

Receive and Transmit Expansion

Alinco DJ-G1T

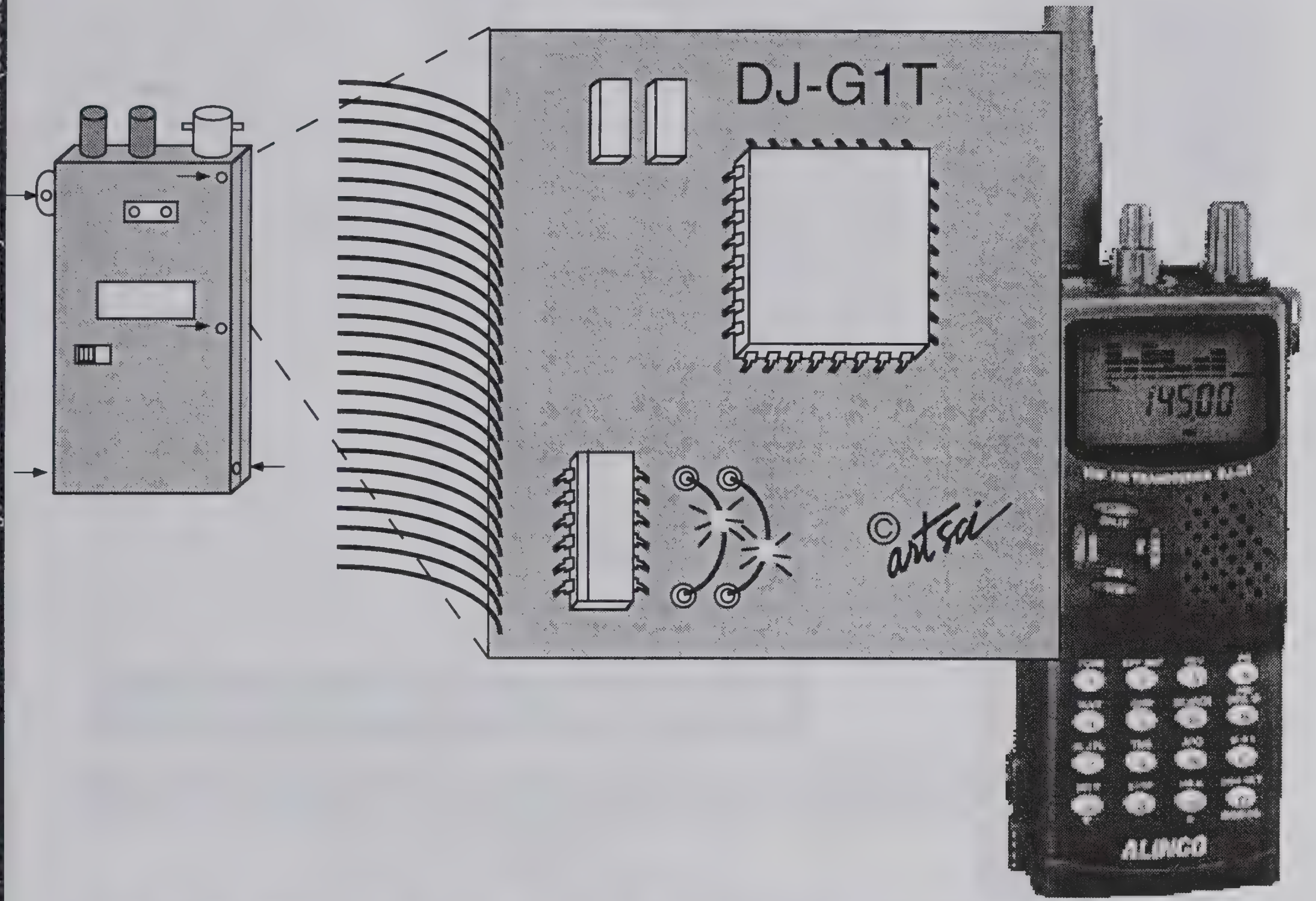
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

TX 130 - 173 MHz
RX 400 - 512 MHz



Modification Instructions

1. Remove Battery and Antenna.
2. Remove five screws from the back and carefully open the radio.
3. Locate and **cut the BLUE and RED wire loops** on the microprocessor board.
4. Reassemble the radio.
5. **Reset the microprocessor.** (Press and hold [FUNC] and turn the radio on)

AM AIRBAND - Press [FUNC] & [Low PTT]

Alinco DJ-G5T Receive and Transmit Expansion

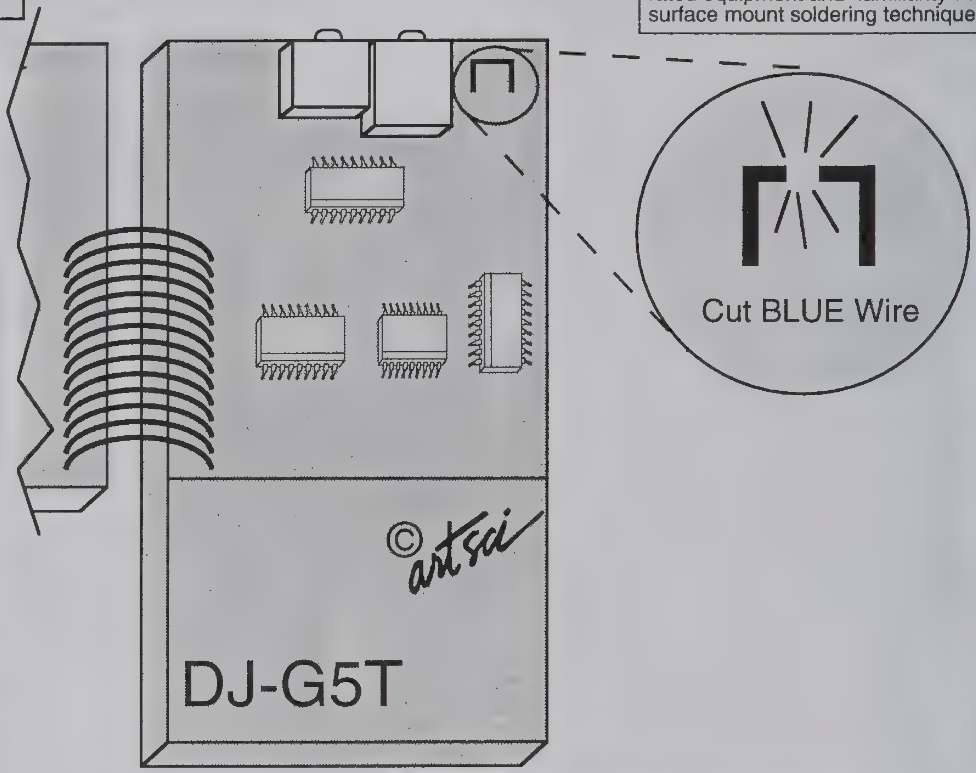
Expansion Range

Not all versions will get full expansion

138 - 165 MHz
420 - 507 MHz

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



DJ-G5E 800-1000 MHz expansion

1. Press and hold [F] and press {FL} twice.
2. Press and hold [F] and [#], [2],[1],[2].
   The Diaplay will say OPEN.
3. Press and hold [F] and press [FL].

The left hand side receiver will receive
110-173 MHx & 400-512 MHZ
The right hand side receiver will receive
130-173, 400-512 & 800-1000 Mhz

Modification Instructions

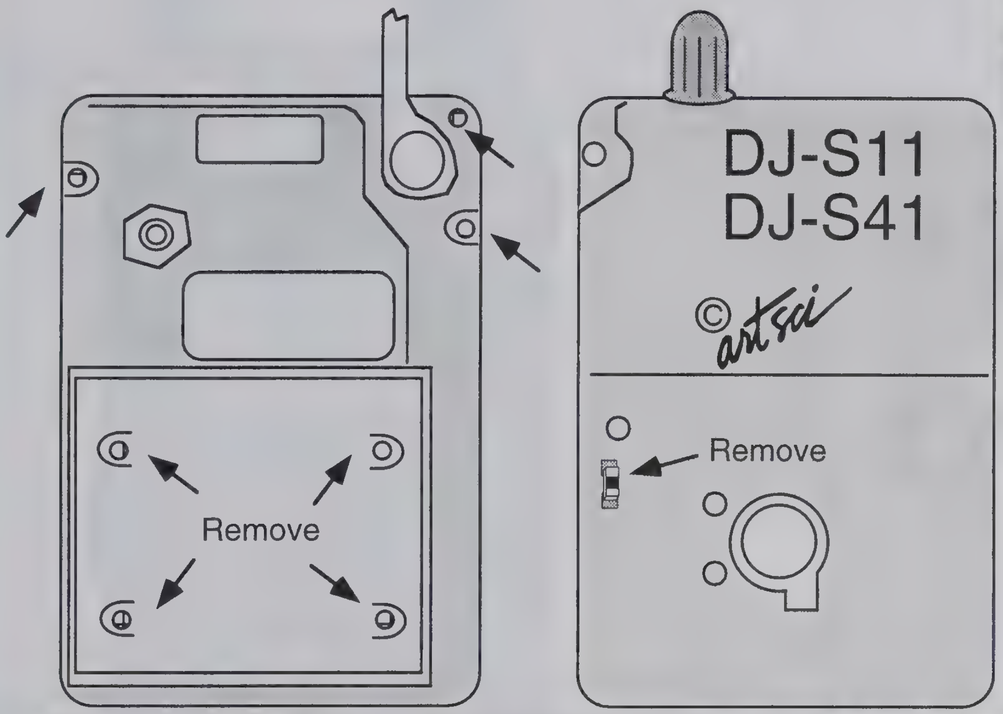
1. Remove battery and antenna.
2. Removefour screws on the back cover
3. Open the radio carefully to avaid damage to the ribbon cable.
4. Locate and **cut the "BLUE" wire.**
5. Reassemble the radio.
6. **Reset the microprocessor.**
   (Press and hold [FUNC] and turn power on)

Receive and Transmit Expansion — Alinco DJ-S11/DJ-S41

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
138 - 165 MHz (S11)
420 - 469 MHz (S41)



Modification Instructions

1) Remove the battery cover and batteries
2) Remove seven (7) screws on the back of the radio.
3) Carefully open the radio.
4) Locate and **remove the GREEN RESISTOR** at the upper-left of the speaker
5) Re-assemble the radio
6) Reset the microprocessor.
(Press and hold [F] and turn the power on)

Clone the DJ-S11

DJ-S11T is not cloneable

1. Program the master radio.
2. Connect the master and slave radio together through the microphone inputs. (use 2.5 mm stereo plugs) The PTT wire should not be connected on the plug.
3. Press and hold [UP] & [DOWN] & [PTT] and turn the power on. (The display will read CLONE)
4. Press PTT on the master.
5. In a few seconds, the clone is complete. (ERR will appear if the process did not work)
6. CHANNELIZE the radio by press and holding [V/M] and turn the power on.

Alinco DJ-V5

Receive and Transmit Expansion

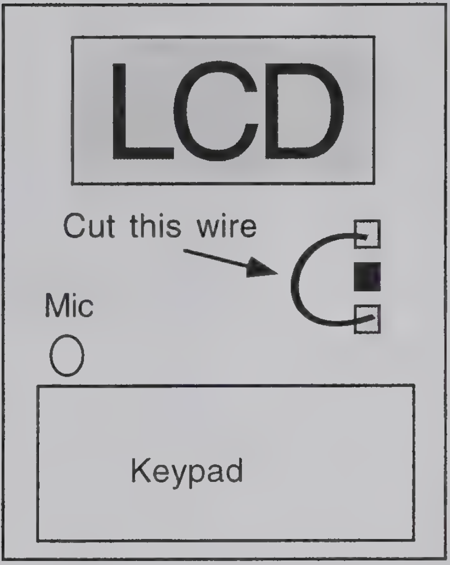
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

76 - 107.995 MHz
108 - 1135.995 MHz
136 - 173.995 MHz
382 - 519.995 MHz
520 - 999.995 MHz
(T version is Cellular blocked)

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Modification Instructions

1. Remove battery and antenna.
2. Remove two screws on back of radio.
3. Remove Volume knob and its rubber cap.
4. Open the radio and remove the diecast interior.
   (Be careful not to displace the silicon rubber from panel and speaker wires)
5. **Cut Wire jumper** as shown.
6. Reassemble the radio
7. Reset the radio.
   A. Turn radio on, Hold [BAND] & turn radio on.
   B. RESET will be displayed
   C. Press "*"

The LCD will flash if the radio Unlocks
Press [FUNC] and 0 [MODE] keys to enter thr RX mode menu.
Select AM/FM/WFM by pressing [MODE]
Press [PTT] to set the RX mode.

Performance Report

Radio ______________________ Date ____________

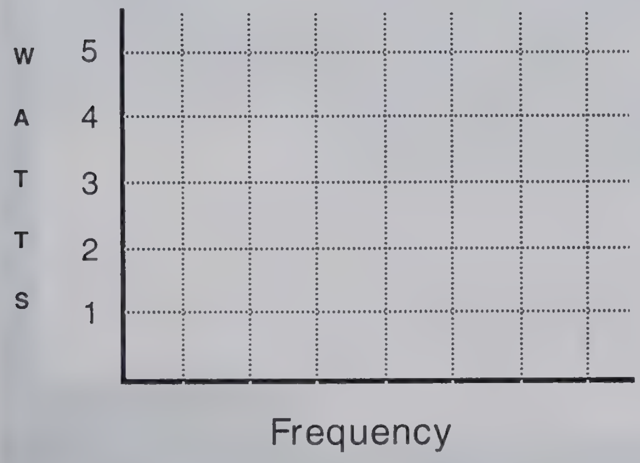
Owner : Name ______________________

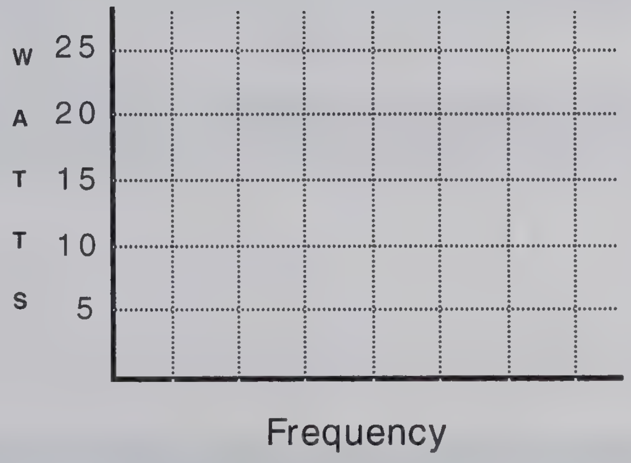
Address ______________________

City ____________ St. Zip ____________

Phone ( ) - ______________________

Description	Before	After
Power out (Low)	________ Watts	________ Watts
Power out (High)	________ Watts	________ Watts
Frequency Error (Simplex)	________ Hz	________ Hz
Frequency Error (Offset)	________ Hz	________ Hz
Receive Sensitivity (Mid-band)	________ uv	________ uv
Receive Sensitivity (_____MHz)	________ uv	________ uv
Receive Sensitivity (_____MHz)	________ uv	________ uv
PL Deviation	________ Hz	________ Hz
DTMF Deviation	________ KHz	________ KHz
Audio Deviation	________ KHz	________ KHz
Lowest usable Freq @ .5 Pwr	________ MHz	________ MHz
Highest usable Freq @ .5 Pwr	________ MHz	________ MHz





Alinco DR-110T/112T/119T Receive and Transmit Expansion

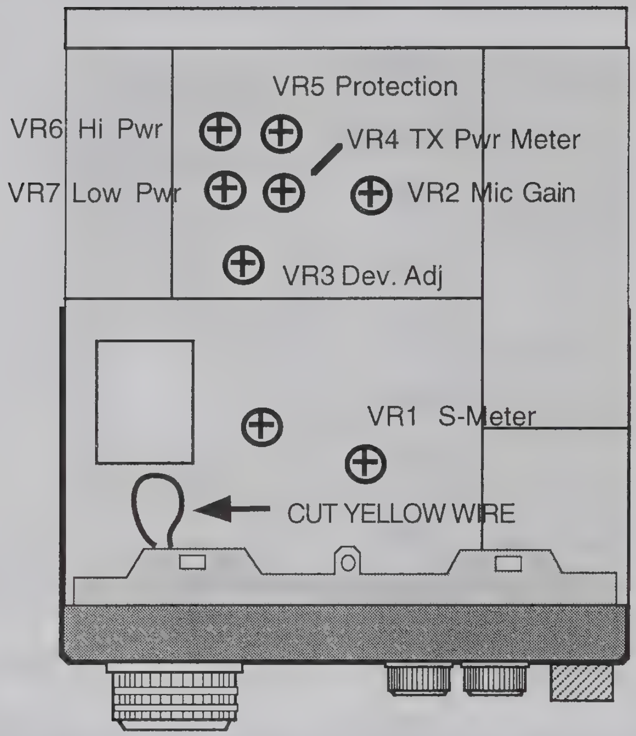
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

130 - 169.95 TX/RX
340 - 379.995 RX
870 - 889.995 RX



VR1 on
Tone squelch
board the
PL Level

One Report states the Yellow wire was Blue in color!

Possible RX Range:
In VFO Press [F] then [MHz]
to toggle from 144 to 360 to 870!

Modification Instructions

1. Remove Power and Antenna.
2. Remove screws from top case and open radio.
3. **Cut the yellow wire** on the control board.
4. Reassemble radio
5. **Reset microprocessor.**
   (Turn radio on. Press and hold [F] and [VFO/M] and turn power off and while still holding keys, turn power back on.

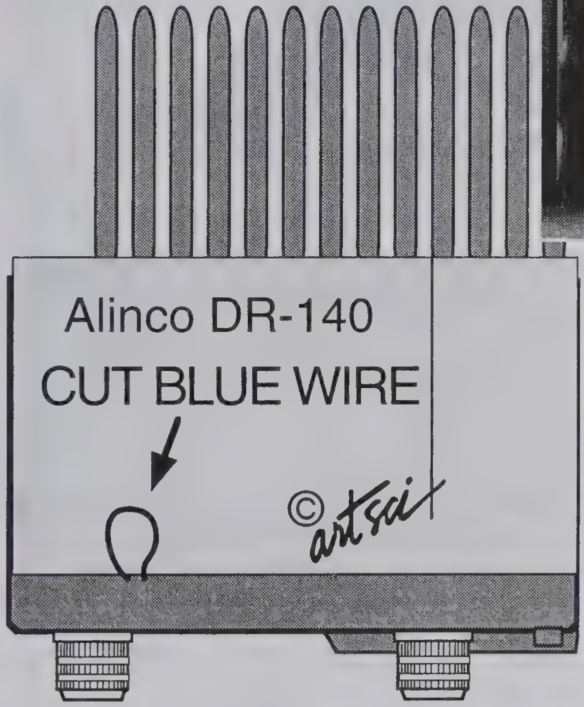
Receive and Transmit Expansion

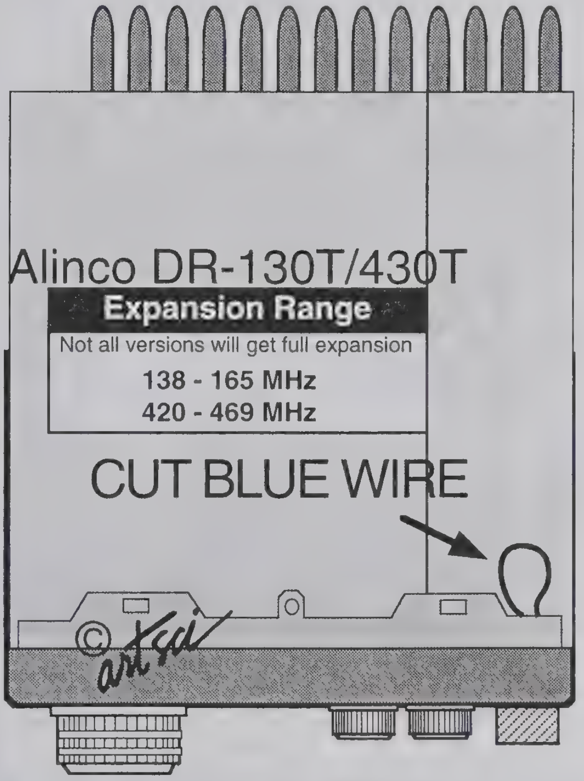
Alinco DR-130T/430T

Alinco DR-140T

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.





Expansion Range
Not all versions will get full expansion
138 - 165 MHz
420 - 469 MHz

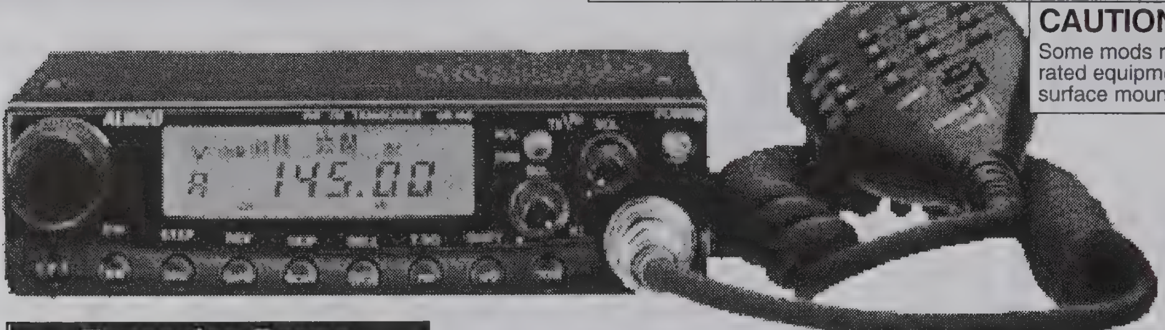
Modification Instructions

1. Remove power and Antenna.
2. Remove the top cover.
3. Locate and **cut the BLUE jumper wire.**
4. Reassemble the radio
5. **Reset the microprocessor.**
   (Press and hold the [FUNCTION] button and turn the radio on)

Alinco DR-150T Receive and Transmit Expansion

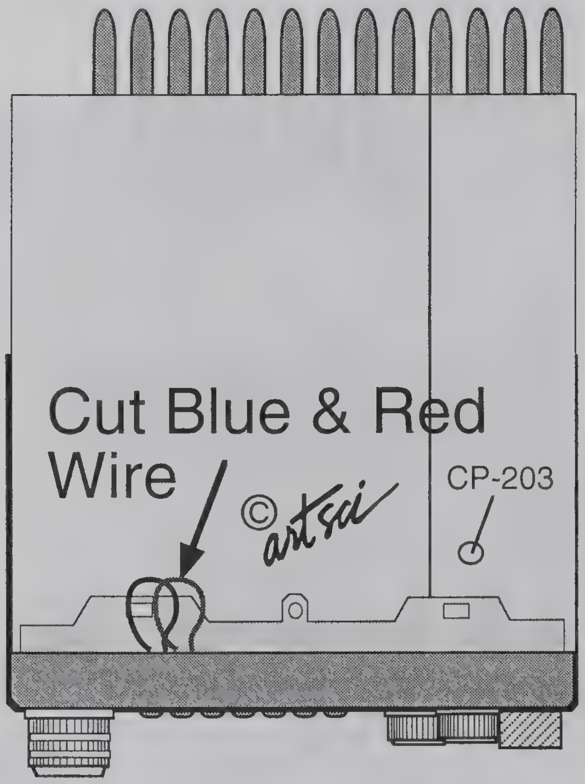
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

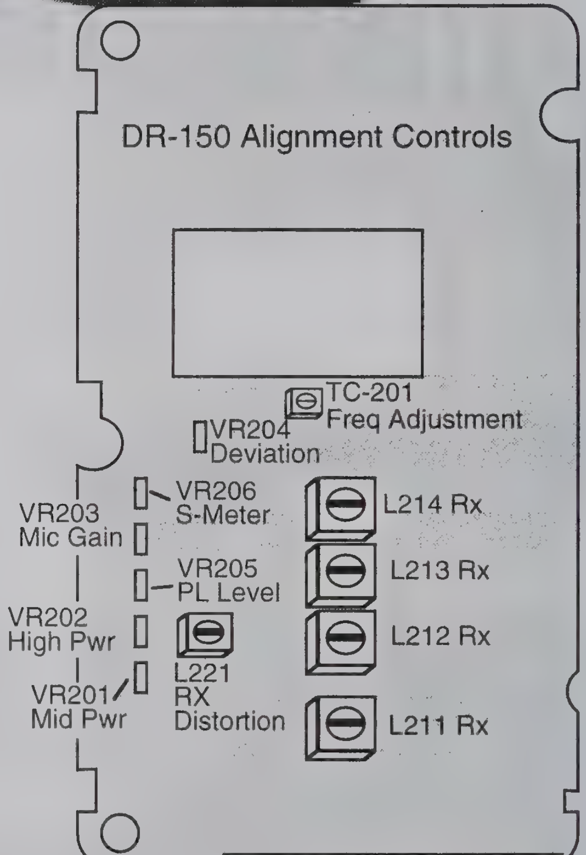
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

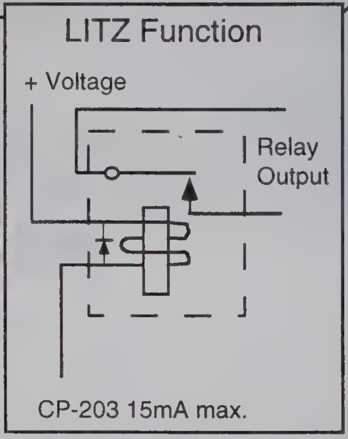


Expansion Range
Not all versions will get full expansion

138 - 165 MHz
430 - 512 MHz







Modification Instructions

1. Remove power and Antenna.
2. Remove the top cover.
3. Locate and **cut the BLUE jumper wire.**(2 meter Mod)
4. Locate and **cut the RED jumper wire.** (440 Mod)
5. Reassemble the radio
6. **Reset the microprocessor.**
   (Press and hold the [FUNCTION] button and turn the radio on)

Receive and Transmit Expansion Alinco DR-510T

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

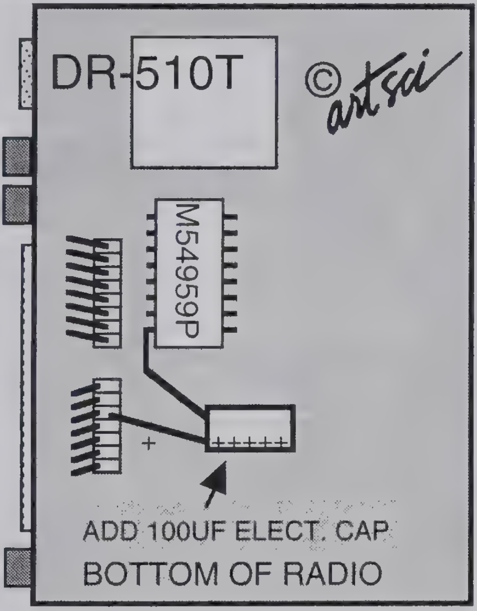
CAUTION: Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

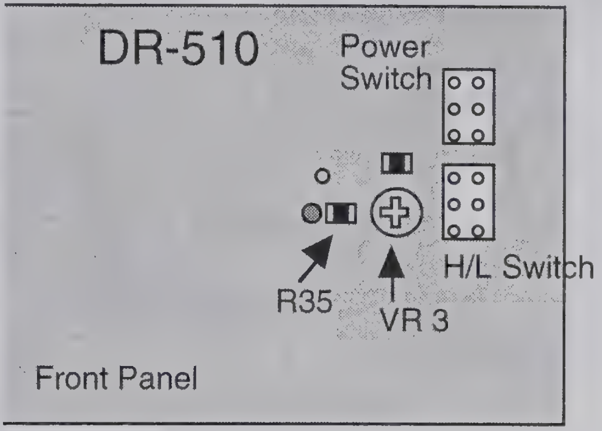
Expansion Range

Not all versions will get full expansion

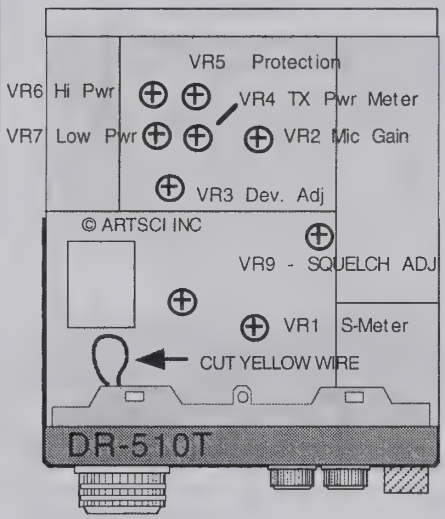
138 - 165 MHz

420 - 469 MHz



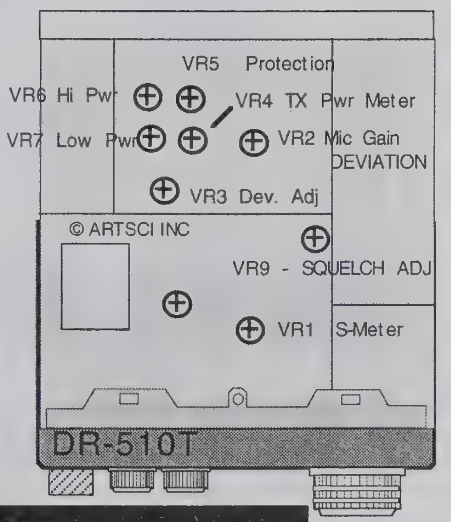


UPPER SIDE (VHF)



VR1 on Tone squelch board the PL Level

BOTTOM SIDE (UHF)



Modification Instructions

1. Remove Battery and Antenna.
2. Remove screws from case and open radio.
3. **Cut the yellow wire** looped around the blue condenser
4. Remove 2 screws from corners of tone board, to expose motherboard.
5. **Solder a 16 volt 100uf electrolytic** as shown. (note 10-100uf)
   - lead to pin 8 of M54959P + lead to third pin of socket (Orange wire)
6. Remove the front cover
7. **Short chip resistor R35** and solder bridge the pads to the left of the resistor.
8. Reassemble radio
9. **Reset microprocessor** (Push reset button)

CROSS BAND REPEATER PROCEDURES -

Select the VHF & UHF frequencies and press [SHIFT] until "DUAL" appears.

TURN ON : Press and hold [REV] and turn power on. The volume control controls the amount of repeater audio.

TURN OFF : Turn radio off.

Alinco DR-570T Receive and Transmit Expansion

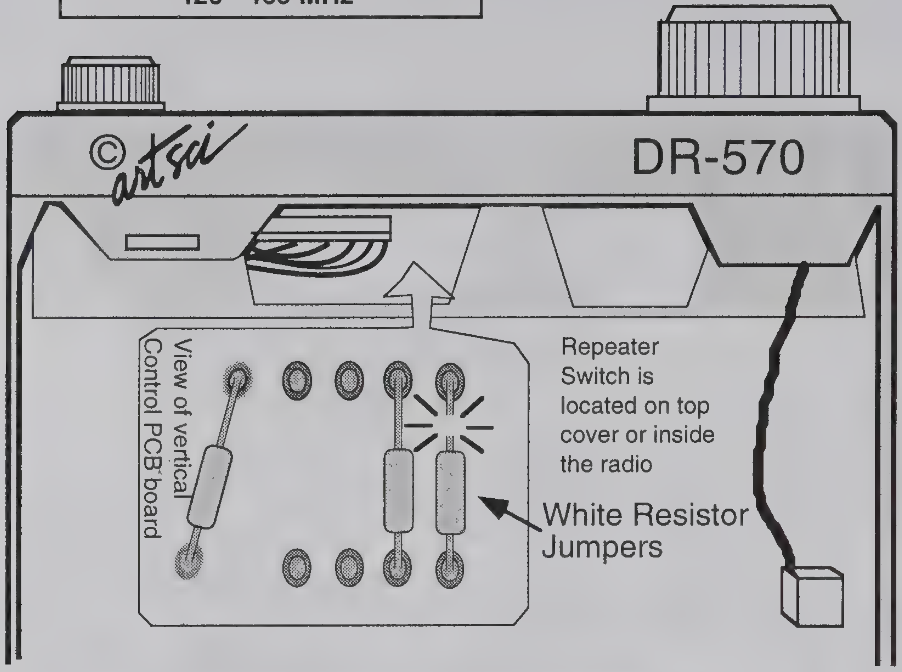
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

138 - 165 MHz
420 - 469 MHz


© artsci
DR-570
View of vertical Control PCB board
Repeater Switch is located on top cover or inside the radio
White Resistor Jumpers

ALIGNMENT	UHF	VHF
TX HIGH POWER	VR5	VR2
TX LOW POWER	VR7	VR4
RF METER	VR6	VR1
DEVIATION	VR3	VR3
SQUELCH ADJ	VR1	VR1
S-METER	VR2	

300 MHz & 800 MHz Receive

300 MHz
In 2 Meter sub band
Press [FUNC] [BAND] [BAND]

800 MHz
Press [FUNC] [BAND] [BAND] [BAND]

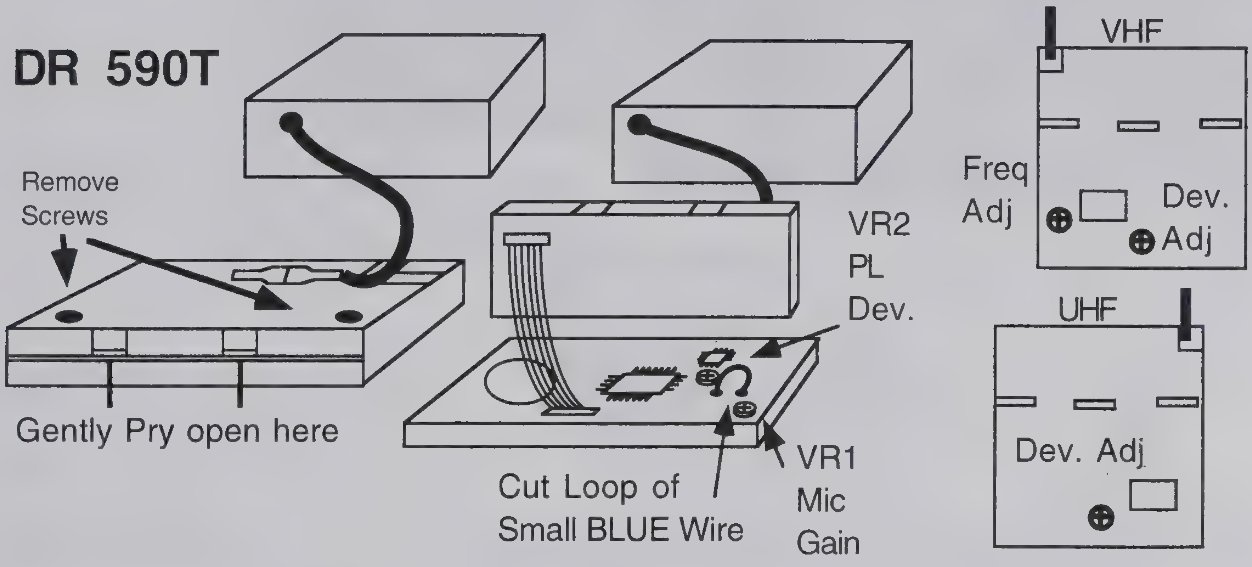
Modification Instructions

1. Remove Power and Antenna.
2. Remove screws from case and open radio (3 screws in the top and 2 on each side.)
3. Locate and **cut the indicated White resistor jumpers.**
   (They are located on the vertical control PCB board.)
4. **Turn repeater/normal switch to repeater mode.**
5. **Reset the microprocessor.** (Press and hold [FUNCTION] and turn power on)
6. Remove the two pin connector to disable audio bleed in repeater mode.
7. Reassemble radio.

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
138 - 165 MHz
420 - 469 MHz



Modification Instructions

1. Remove Power and Antenna.
2. Remove the four screws, (2 on each side) holding the LCD display to the main body of the radio.
3. DO NOT DISCONNECT THE BLACK CONNECTOR CABLE FROM THE LCD DISPLAY.
4. Locate and unscrew the 2 screws holding the LCD display together.
5. Carefully separate the back cover of the display from the front cover. Use a flat blade screwdriver to apply slight pressure to the locking tabs in the top of the display.
6. Locate and **cut the loop of BLUE wire.**
7. Reassemble the radio.
8. **Reset the microprocessor.** (Press and hold the [FUNCTION] key and turn power on.)

Cross Band Repeater Instructions

ENABLE REPEATER MODE: Simultaneously press the [FUNCTION] key and the [VHF] Key.
The display will alternate between VHF and UHF every 3 seconds.

DISABLE REPEATER MODE: Simultaneously press the [FUNCTION] key and the [UHF] Key.

An audio frequency response kit is available from Alinco. Contact them for the parts and instruction sheet. (This is for improving the Cross-band repeater audio)

Alinco DR-599T Receive and Transmit Expansion

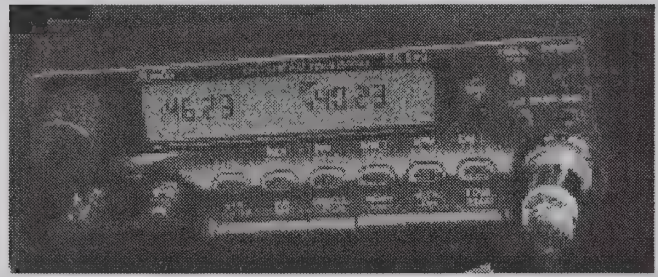
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

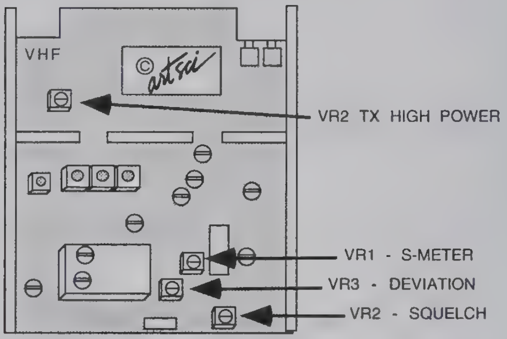
Expansion Range

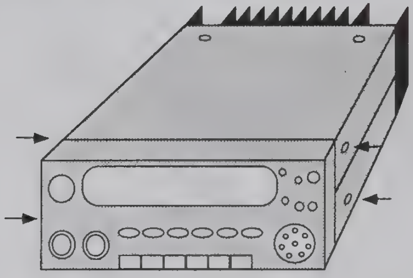
Not all versions will get full expansion

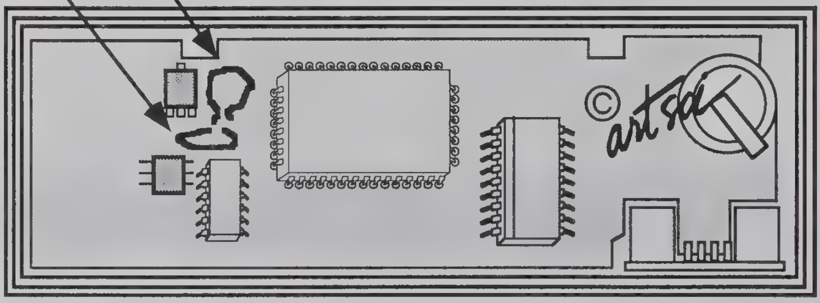
138 - 165 MHz
420 - 469 MHz

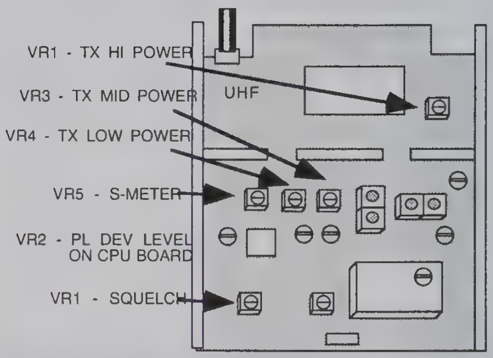
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

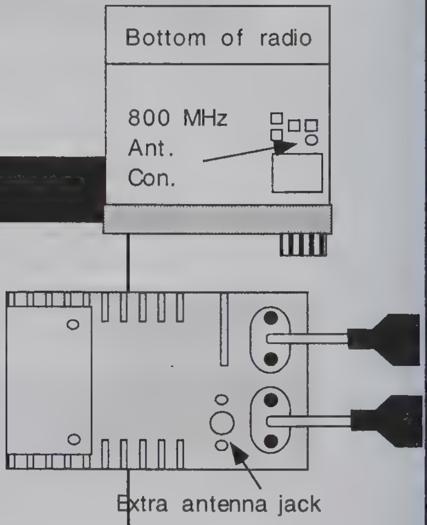












Modification Instructions

1. Remove the Power cable and Antenna.
2. Remove the 4 screws, (two on each side).
   HOLD THE CONTROL HEAD against the main unit.
3. Remove the 2 screws holding the control head together.
4. Carefully separate the back and front cover of the control unit.
5. **Cut the RED wire** to allow reception in the Aircraft and the 800 MHz band.
6. **Cut the BLUE wire** to expand the TX & RX frequencies.
7. Reassemble the control head.
8. Remove the bottom cover. (two additional screws on the bottom cover)
9. For 800 MHz RX, feed a new antenna cable through the optional antenna jack on the back of the main body of the radio. (Order Optional Ant. Kit EAK-599 from Alinco)
10. Locate antenna connector CN59 and attach the antenna cable.
11. Reassemble the radio .
12. **Reset the Microprocessor**. (Push and hold the [FUNC] key and turn the power on)

Press [VHF] & [UHF] button twice
to access new Features

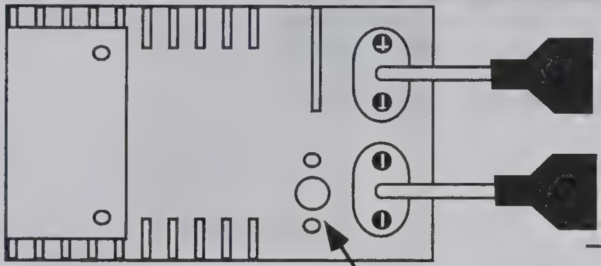
Receive and Transmit Expansion

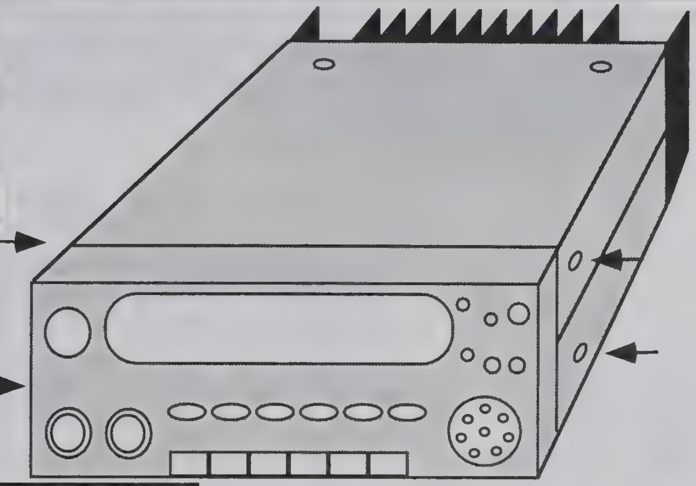
Alinco DR-600T

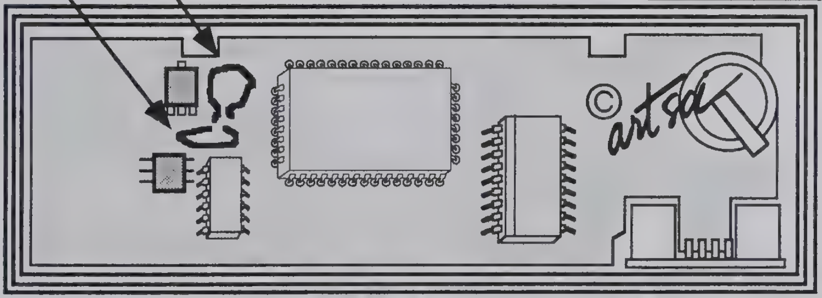
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



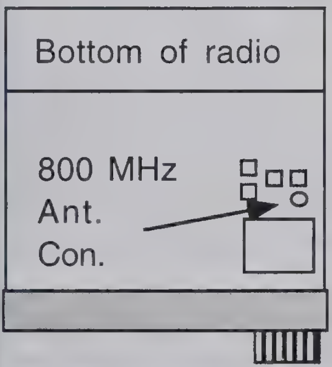




Expansion Range

Not all versions will get full expansion

130 - 173.999 MHz
440 - 519 MHz



Modification Instructions

1. Remove the Power cable and Antenna.
2. Remove the 4 screws, (two on each side).
   HOLD THE CONTROL HEAD against the main unit.
3. Remove the 2 screws holding the control head together.
4. Carefully separate the back and front cover of the control unit.
5. **Cut the RED wire** to allow reception in the Aircraft and the 800 MHz band.
6. **Cut the BLUE wire** to expand the TX & RX frequencies.
7. Reassemble the control head.
8. Remove the bottom cover. (two additional screws on the bottom cover)
9. For 800 MHz RX, feed a new antenna cable through the optional antenna jack on the back of the main body of the radio. (Order optional Ant. kit EAK-599 from Alinco) (**DR-600TB** HAVE THE 800 RX REMOVED!! Ser # starts with "TB")
10. Locate antenna connector CN59 and attach the antenna cable.
11. Reassemble the radio .
12. Reset the Microprocessor. (Push and hold the [FUNC] key and turn the power on)

21

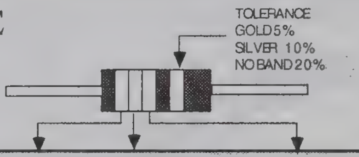
BOB Simpleton's Guide to Color codes

As seen in the ***Amateur Radio Trader***

The electronic industry created a standard for color coding parts many, many years ago. The same color code is used on all different types of components. With a little effort, and a good memory, the basic color code can be memorized. In color code sequence is: BLACK, BROWN, RED, ORANGE, YELLOW, GREEN, BLUE, VIOLET, GRAY and WHITE. The number sequence that corresponses with the color code starts with zero; Black=0, Brown=1, Red=2, etc.

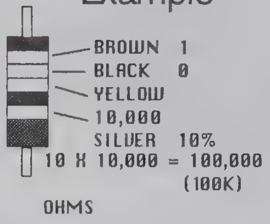
Components using color stripes and surface mount components use the 'significant' digit system paired with a multiplier digit, based on the powers of ten. An additional color stripe is also used to determine the accuracy or tolerance of the component. Higher accuracy components requires more significant digits to accurately describe the value. 5% accuracy parts use two 2 significent digits colors stripes followed by the multliper color stripe. 2% and 1% components often use 3 significent digit colors stripes .

RESISTOR COLOR CODE



COLOR	1st DIGIT	2nd DIGIT	MULTIPLY BY
BLACK	0	0	1
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
VIOLET	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	1,000,000,00
GOLD			0
SILVER			.1
			.01

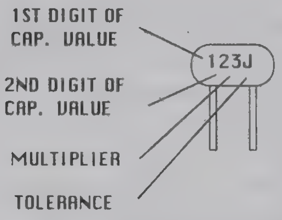
Example



Resistor standard values (significant digits)

10	brown	black	33	orange	orange
11	brown	brown	36	orange	blue
12	brown	red	39	orange	white
13	brown	orange	43	yellow	orange
15	brown	green	47	yellow	purple
16	brown	blue	51	green	brown
18	brown	gray	56	green	blue
20	red	black	62	blue	red
22	red	red	68	blue	gray
24	red	yellow	75	purple	green
27	red	purple	82	gray	red
30	orange	black	91	white	brown

CAPACITORS



MULTIPLIER		TOLERANCE		
	MULTIPLY BY		10pF or less	over 10pF
0	1	B	0.1pF	
1	10	C	0.25pF	
2	100	D	0.5pF	
3	1,000	F	1.0pf	1%
4	10,000	G	2.0pf	2%
5	100,000	H		3%
		J		5%
8	.01	K		10%
9	0.1	M		20%

Most common resistors are in the 5 to 10% tolerance range. Silver is used for 10% and gold is used for 5%. 20% resistors have no tolerance color bar.

One very common resistor is color coded: red red orange gold. Take a moment and see if you can use the attached resistor table and calculate the value..

If you calculated a 22,000, 5% resistor, you are correct. It is calculated like this: $22 \times 10^3 = 22{,}000$. What possible readings would you expect if you connected this resistor to an ohm meter?

Since it is a 5% tolerance resistor, the measured value will be between 19.800 and 24,200 ohms. That is calculated be allow 5% above and below the stated value.

Surface mount resistors do not use color stripes. The 2 significent digits and multiplier digit are printed right on the top of the component. These components are very, very small. The printed digits are often so small, you may need a magnifying glass to read them.

A surface mount resistor marked 103 would be a 10,000 ohm resistor (10k ohms). For everyone interested in mathematics, the formula is $10 \times 10^3 = 10{,}000$

A little practice will make reading resistors and other electronic componets easy as pi. 73, Bob

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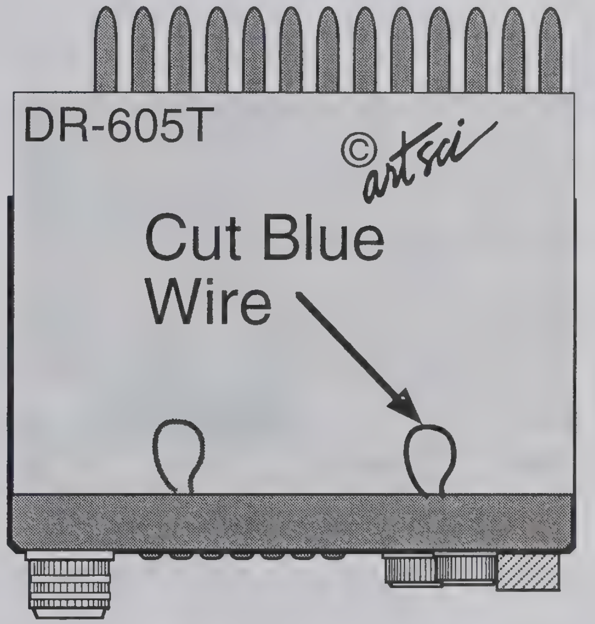
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

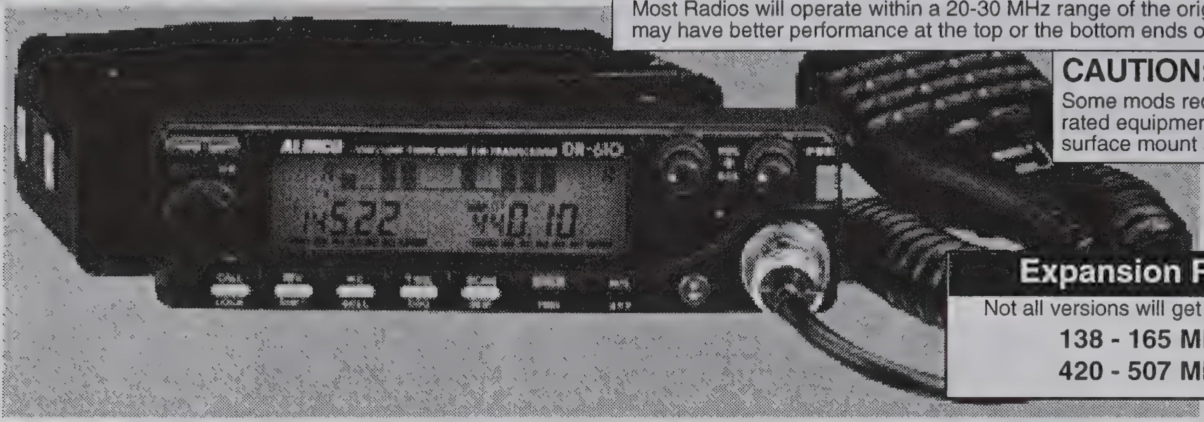
Expansion Range
Not all versions will get full expansion
136 -173.995 MHz
400 - 480 MHz



Modification Instructions

1. Remove the power and the antenna.
2. Remove four screws securing the top cover and the cover.
3. Locate and **cut the BLUE jumper wire** behind the front panel.
   (Place tape on the end of the wires to prevent shorting.)
4. Reassemble the radio.
5. Reset the microprocessor.
   (Press and hold [FUNC] and turn the power on.)

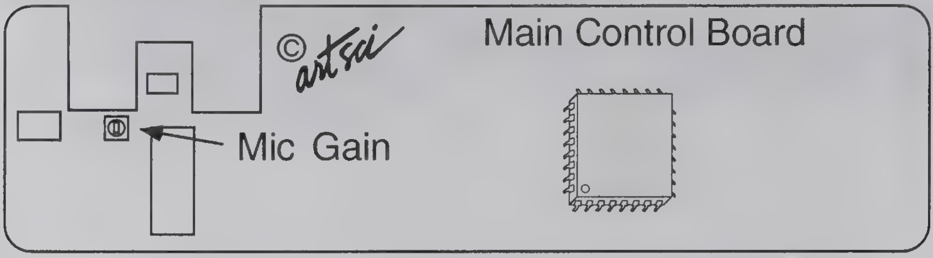
Alinco DR-610T Receive and Transmit Expansion

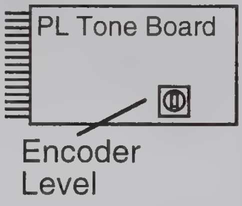


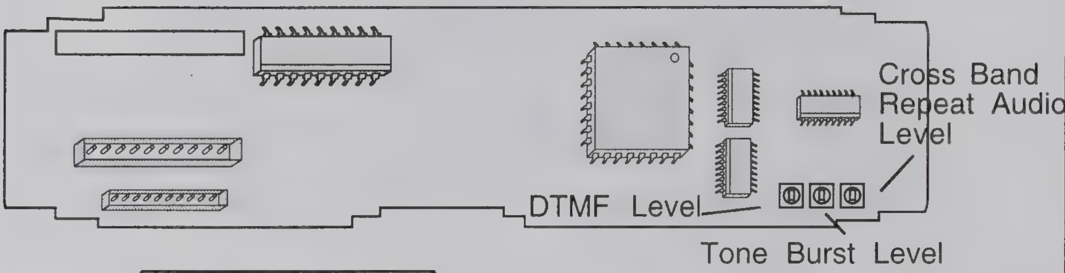
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

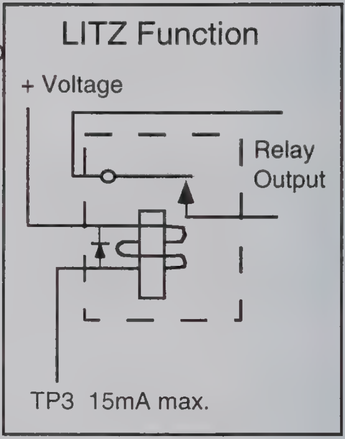
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

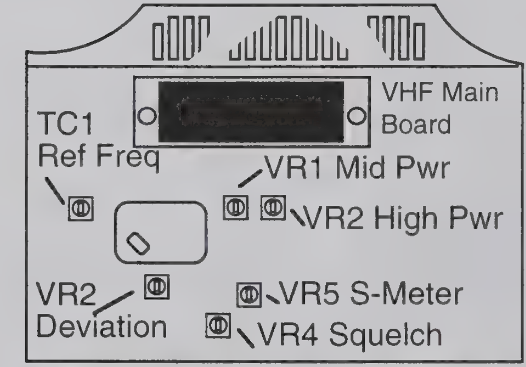
Expansion Range
Not all versions will get full expansion
138 - 165 MHz
420 - 507 MHz

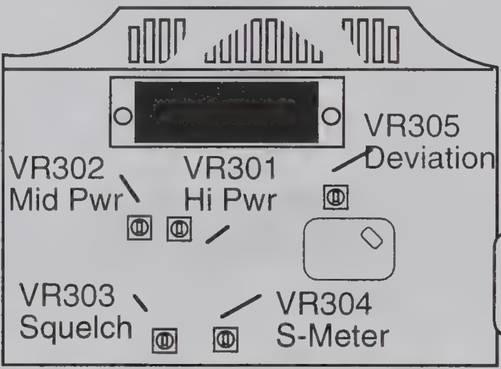


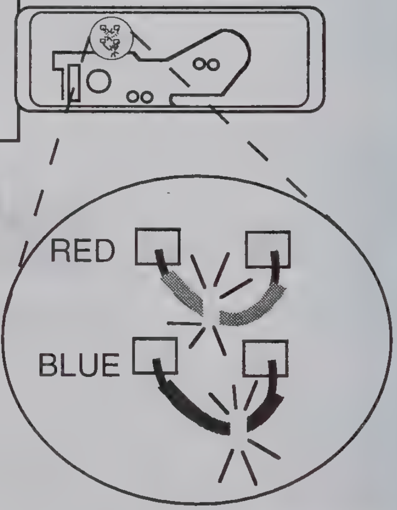












Modification Instructions

1. Remove the Power cable and Antenna.
2. Remove the 4 screws, (two on each side).
   HOLD THE CONTROL HEAD against the main unit.
3. Remove the 2 screws holding the control head together.
4. Carefully separate the back and front cover of the control unit.
5. **Cut the RED wire** to allow reception in the Aircraft and the 800 MHz band.
6. **Cut the BLUE wire** to expand the TX & RX frequencies.
7. Reassemble the control head.
8. Reset the Microprocessor.
   (Push and hold the [FUNC] key and turn the power on)

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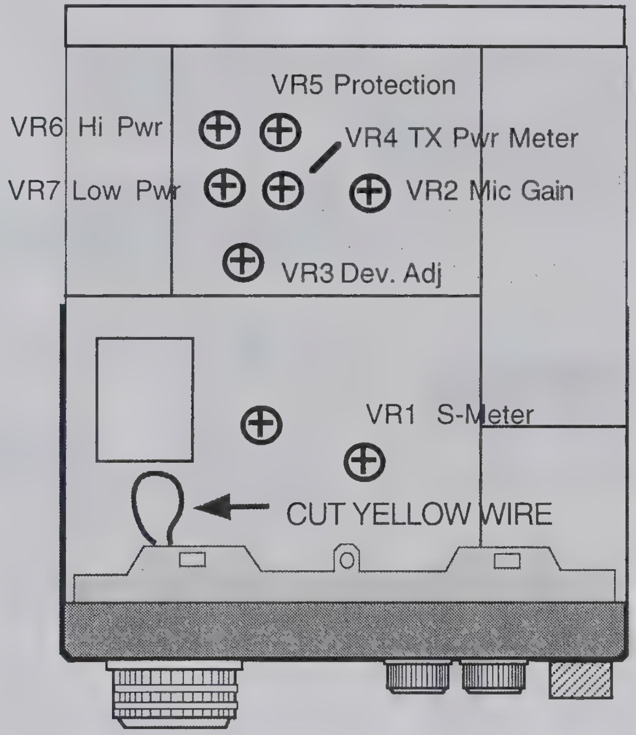
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



VR1 on Tone squelch board the PL Level

Modification Instructions

After cutting Yellow wire:

Press and hold [FUNC] & [VFO/M] button and turn the power on.

Alinco DR-M06 & M03

Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

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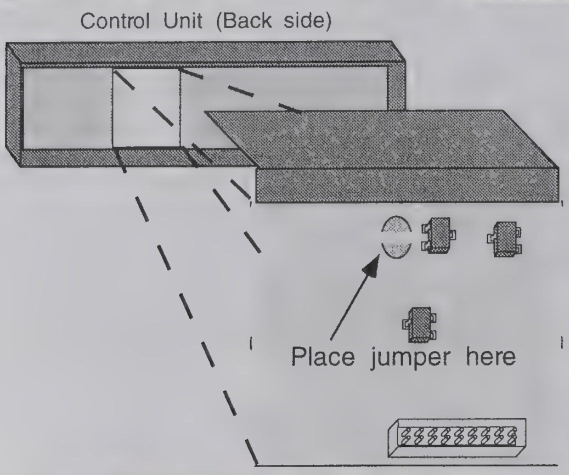


Modification Instructions

1. Remove top and bottom covers.
2. Remove the main dial from the case.
3. Remove the front plastic case.
4. Unscrew the 3 screws on the control unit and remove.
5. Locate jumper locations (see diagram)
6. **Place solder bridges on jumper**
7. Reassemble the radio.
8. Reset the microprocessor
   ess and hold [FUNC] and turn power on)

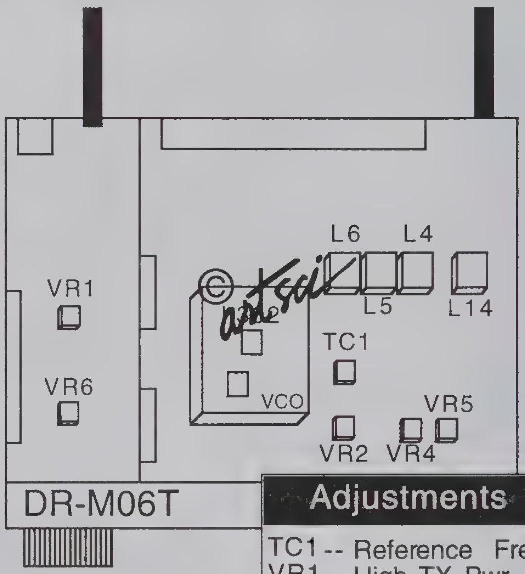
Expansion Range

Not all versions will get full expansion

DR-M03 : 26 - 34 MHz TX & 26 - 40 MHz RX
DR-M06 : 45 - 60 MHz TX & 40 - 60 MHz RX
DR-M06TH : 40 - 60 MHz TX & 32 - 87 MHz RX

Expanded Rx only Modification

Press and hold the [CALL] key and turn radio on.

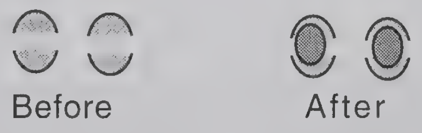


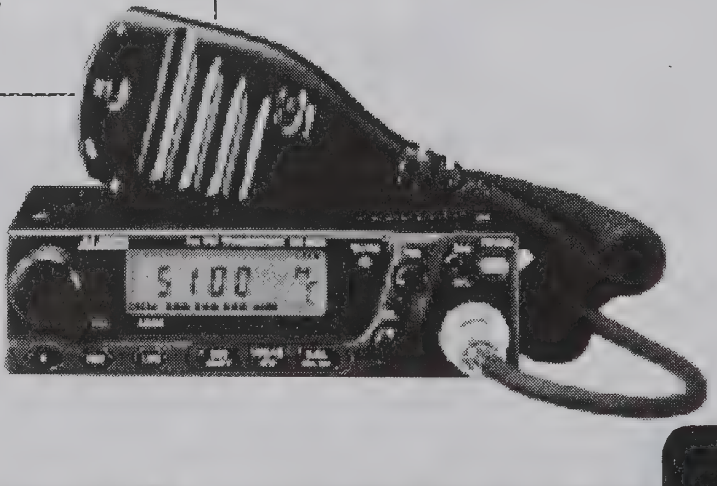
Adjustments

TC1 -- Reference Freq.
VR1 -- High TX Pwr
VR2 -- Deviation
VR4 -- Mic Gain
VR5 -- S-meter Adj.
VR6 -- Low TX Pwr

DR-M06TH Modification

1. Remove top and bottom covers.
2. L ocate on back of front panel (Near Microprocessor), 4 COPPER Solder points.
   (1-1/2 inch from left sode of MicroP)
3. Connect top pads to bottom pads.
4. Reassemble the radio.
   (Press and hold [FUNC] and turn power on)





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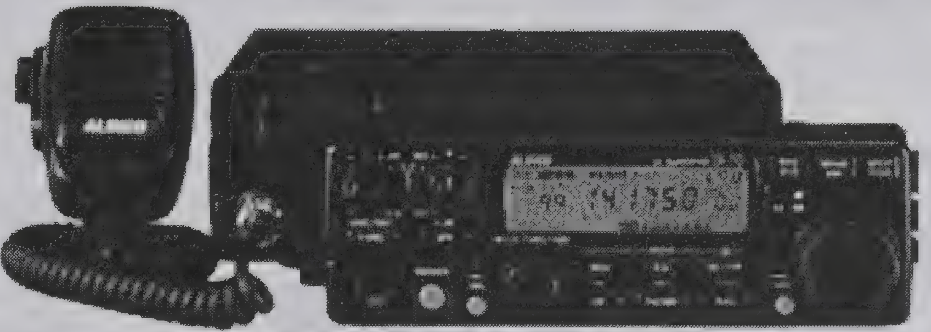
Receive and Transmit Expansion

Alinco DX-70T/TH

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

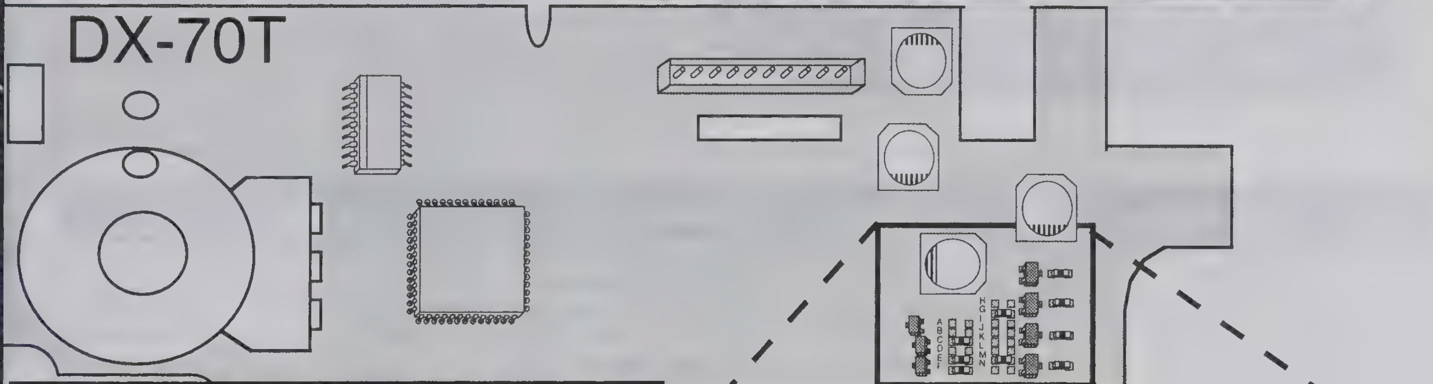
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Expansion Range

Not all versions will get full expansion

30 KHz - 35 MHz
45 MHz - 60 Mhz

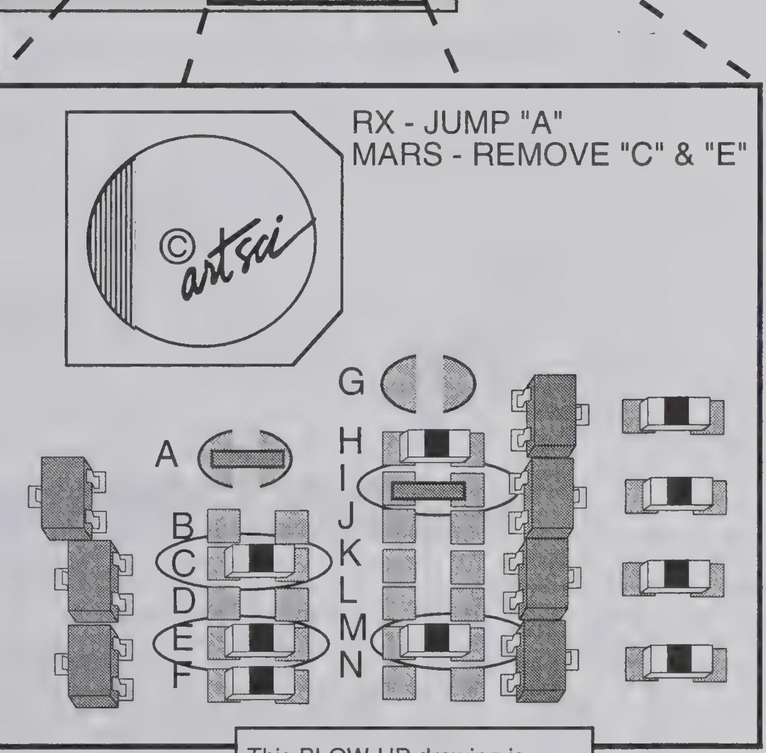


Expanded RF Modification

1. Remove power and antenna.
2. Remove control head and disconnect the control cable.
3. Remove 2 screws from the back of the control head.
4. Remove the back cover from the control head.

5. **Remove resistor from "C" & "E"** (Entended TX)
   Remove "M" (Entended RX - Low End 30 KHz)
   Add a jumper to "A" (Extended RX high end 35 MHz)
   Add a jumper to "I" (extended 6 meters 45-60 MHz)

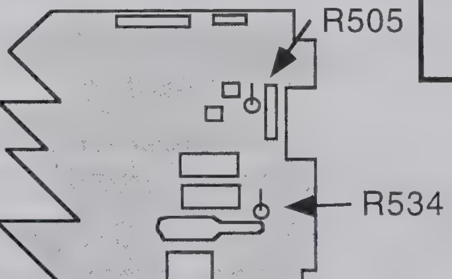
6. Reassemble the radio.
   The board must be put in properly or the buttons will not work.
7. Reset the microprocessor.
   (Press and hold [F] and turn the radio on.)



This BLOW-UP drawing is intended to help you locate the proper parts.
The parts presented here are for reference only. Not all these parts may be present in your radio.

External Amplifier Relay Modification

Locate and remove R505
Locate and remove R534 (next to relay)



Alinco DX-77T Receive Expansion

Expansion Range

Not all versions will get full expansion

30 KHz - 35 MHz

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

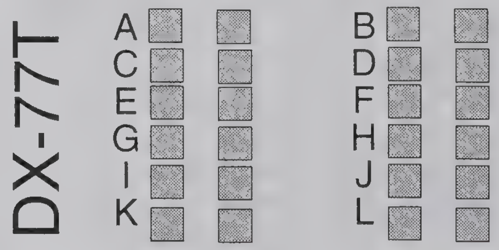
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Short or open pads as shown

For full expansion:
Pad A shorted
Pad C Open
Pad D open

PAD	Purpose	Pad Open	Pad Closed	Comments
A	Frequency Upper Limit	30 MHz	30 MHz	Display Only
B	Frequency Lower Limit	150 Khz	30 Khz	
C	TX Range 1	See Below	See Below	
D	TX Range 2	See Below	See Below	
E	Resetting	Enabled	Disabled	Disable for Commercial Use
F	Set Mode Entry	Enabled	Disabled	Disable for Commercial use
G	VFO / Memory	VFO <> Memory	Memory Only	"Memory only" for Commercial use
H	Memory Display	CH, + Grequency	Ch. Only	Valid only when "G" is shorted
I	<RESERVED>			
J	Function Operation	Enabled	Disabled	Disable for Commercial use
K	Function Long Press	Enabled	Disabled	Disable for Commercial use
L	<Reserved>			

	Pad D Open	Pad D Shorted
Pad C Open	1.6 to 30 MHz (35 MHz if A is shorted)	U.S. Amateur Band Plan
Pad C Shorted	Japanese Amateur Band Plan	EEprom Band Plan



Pad Location:

Back side of Front Control unit to the right of the Speaker

BOB Simpleton's Guide to PL Decoding/ speaker Muting

It is sometimes useful to keep your radio on at all times while waiting for an important call. However the chatter of other users may become a problem.

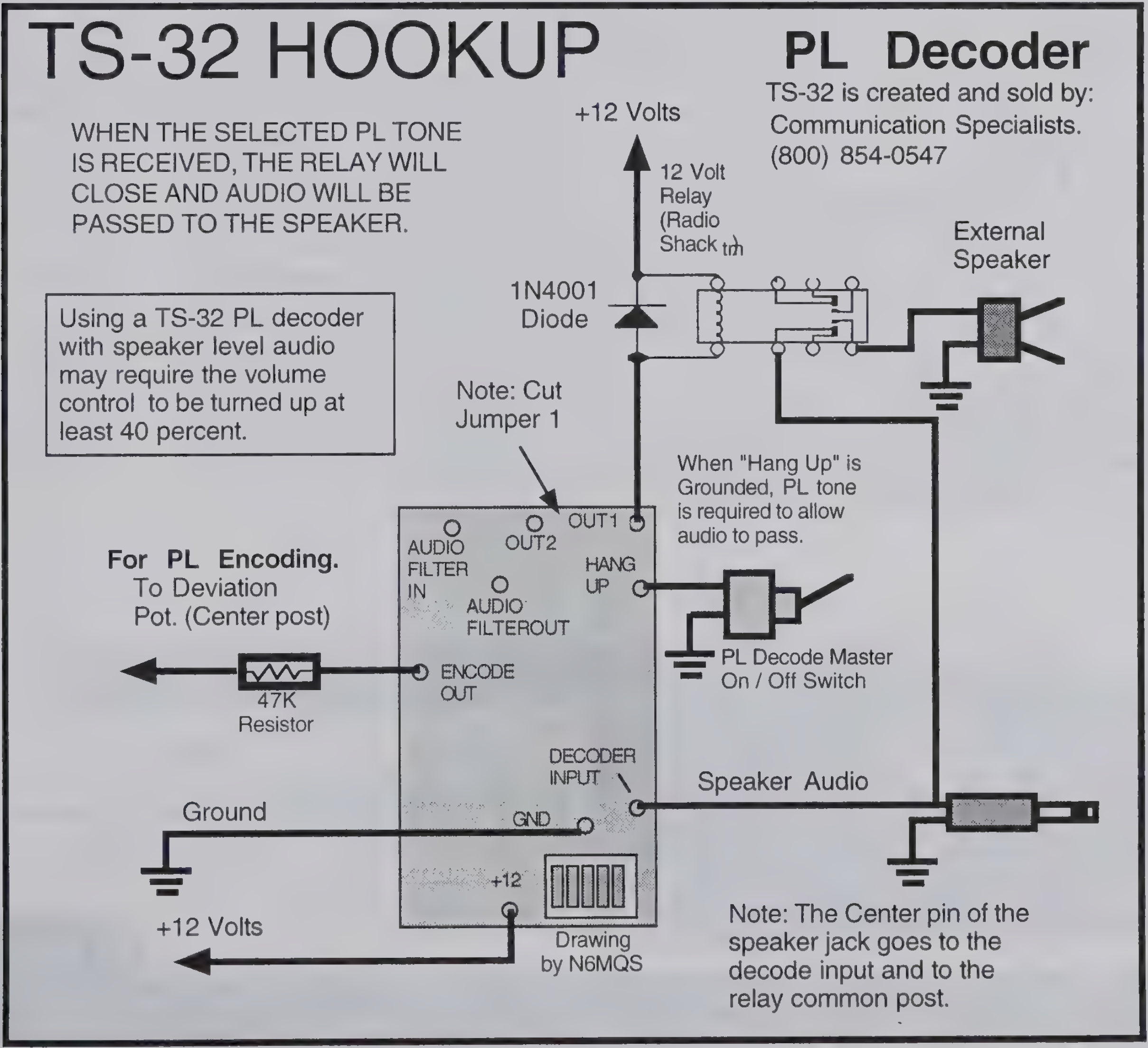
My good friend Bill likes to have his wife Jan monitor the base radio at home. During high radio traffic times, she will turn the volume down to avoid listening to others. It is then to low for her to hear Bill when he calls.

Bill put together this simple PL decoder circuit and attached it to his base radio. Now the radio speaker is disconnected unless the proper subaudable PL tone is used. Bill always transmits the correct PL tone when he wants to talk to Jan at home. He keeps the base radio volume very high so Jan can hear him calling from almost anywhere in the house.

His circuit was created using the popular TS-32 PL Decoder by Communication Specialists. Most repeater systems use this decoder because it is very reliable and simple to use.

He has included a defeat switch to remove the PL requirement when using the radio for normal two-way communications. The TS-32 PL Decoder board has a special "HANG UP" pin that is grounded through the switch and will keep the relay triggered and all audio will pass to the speaker.

Bill suggested using the other side of the relay to activate a horn, buzzer or light of some kind. I built one of these circuits and used it in the car to flash a light when one of my friends call me. I see the light and turn the stereo down and answer the call. 73 and have some fun.



TS-32 HOOKUP

PL Decoder

TS-32 is created and sold by:
Communication Specialists.
(800) 854-0547

WHEN THE SELECTED PL TONE IS RECEIVED, THE RELAY WILL CLOSE AND AUDIO WILL BE PASSED TO THE SPEAKER.

Using a TS-32 PL decoder with speaker level audio may require the volume control to be turned up at least 40 percent.

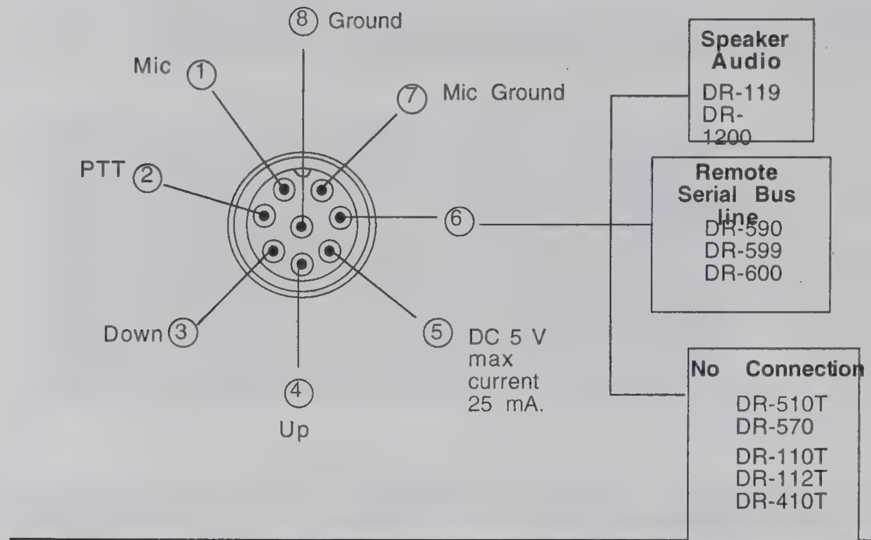
When "Hang Up" is Grounded, PL tone is required to allow audio to pass.

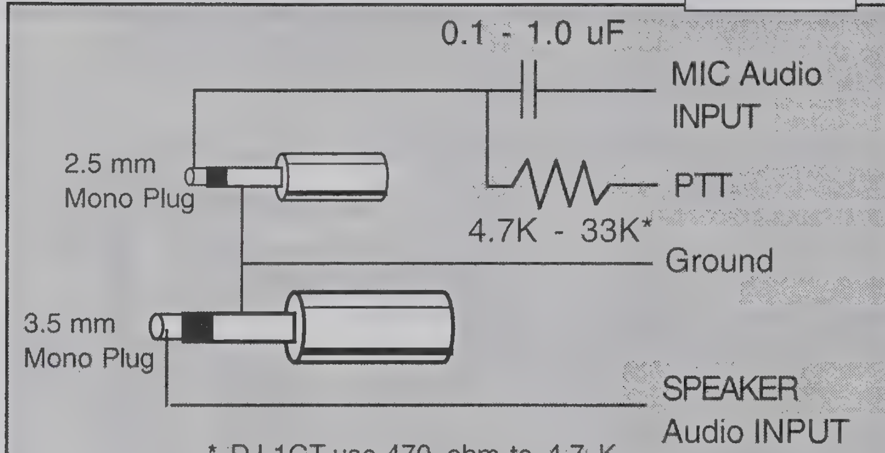
Note: The Center pin of the speaker jack goes to the decode input and to the relay common post.

Alinco Packet Connections for Mobiles & Hand Helds

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

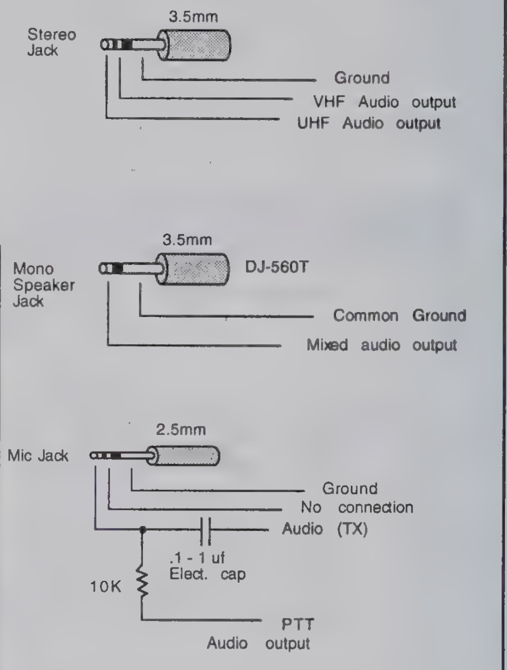




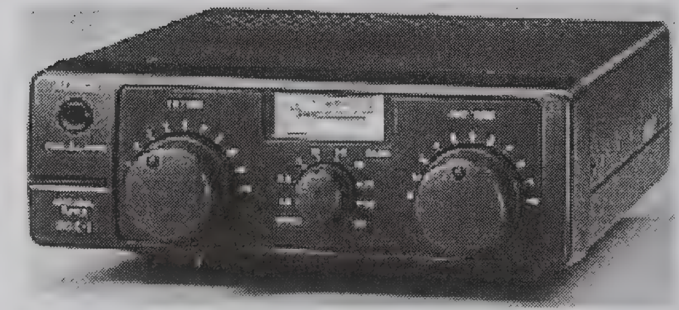
* DJ-1GT use 470 ohm to 4.7 K
DJ-180 use 4.7 ohm to 33 k
DJ-580 uses 1K to 10K

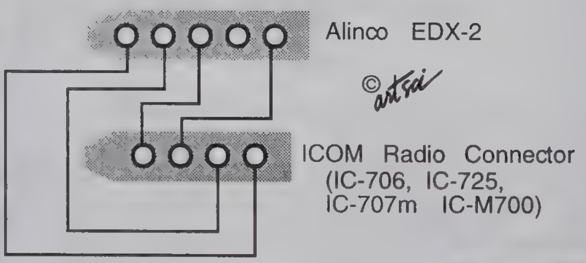
DJ-160, DJ-162, DJ-460, DJ-560 use mono plugs
DJ-580 uses Stereo Plugs with the RING (Center section) not used)
DJ-180 uses a Mic Stereo Plug with the RING (Center section) not used)
DJ-G1T uses a Mic Stereo Plug with the RING (Center section) not used)

Hand Helds



Alinco EDX-2





Radio	Modification	Page #
C-108A	Expanded RF	Standard - 2
C-156	Expanded RF	Standard - 3
C-158	Expanded RF	Standard - 4
C-168A	Expanded RF	Standard - 5
C-168S	Expanded RF	Standard - 6
C-178	Expanded RF	Standard - 7
C-188	Expanded RF	Standard - 9
C-228	Expanded RF	Standard - 10
C-288	Expanded RF	Standard - 10
C-468A	Expanded RF	Standard - 11
C-468S	Expanded RF	Standard - 12
C-488	Expanded RF	Standard - 13
C-508	Expanded RF	Standard - 14
C-510	Expanded RF	Standard - 15
C-528	Expanded RF	Standard - 17
C-558	Expanded RF	Standard - 18
C-568	Expanded RF	Standard - 19
C-628	Expanded RF	Standard - 20
C-1208	Expanded RF	Standard - 21
C-5608	Expanded RF	Standard - 22
C-5718	Expanded RF	Standard - 23
C-5900	Expanded RF	Standard - 24
PACKET	Expanded RF	Standard - 25

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Standard C108A Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

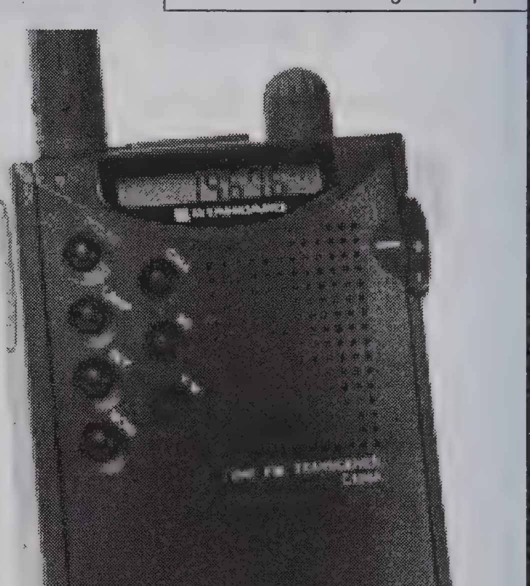
Not all versions will get full expansion

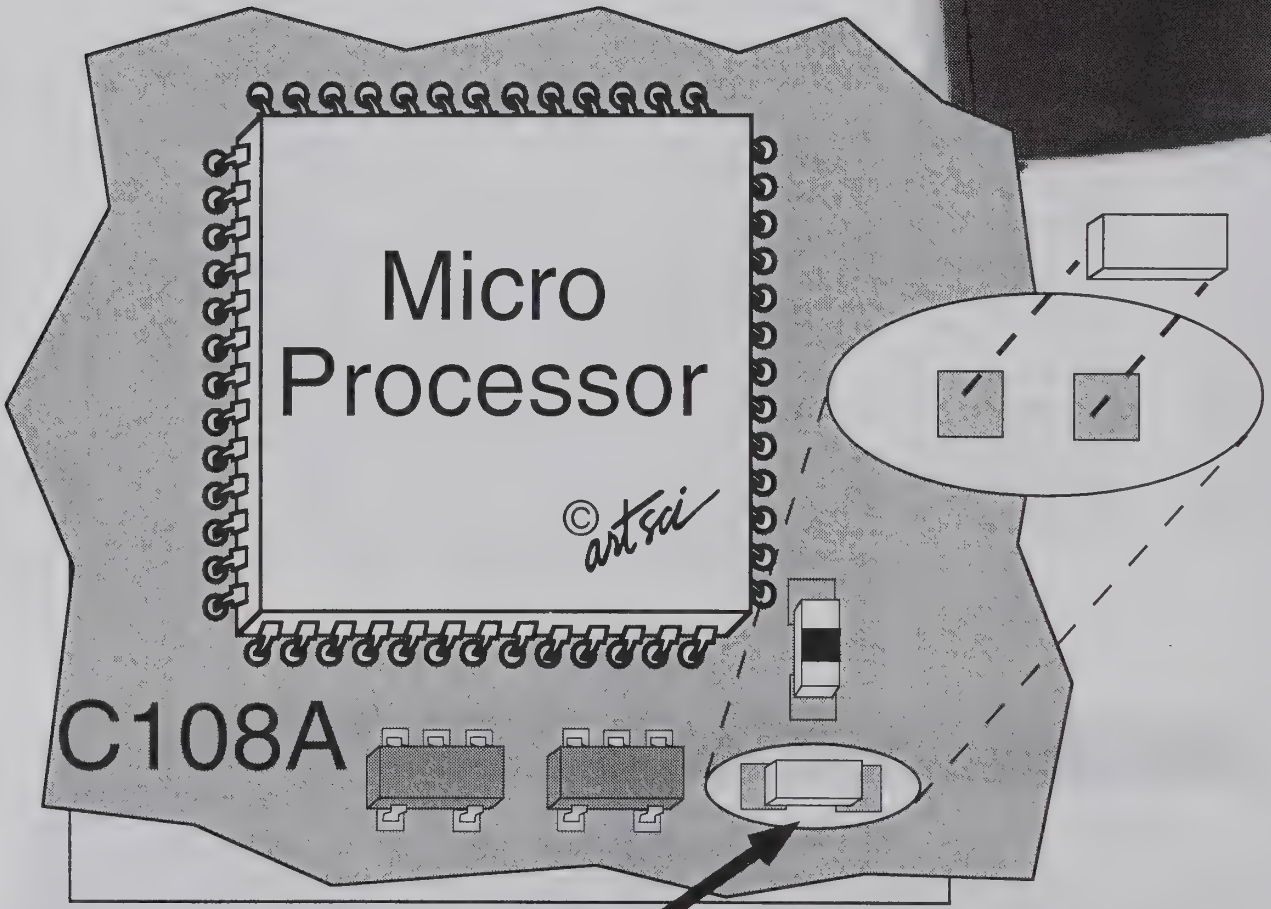
105 - 138 MHz AM RX
140 - 174.995 MHz RX
120 - 160 MHz TX

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Modification Instructions

1. Remove Battery and Antenna.
2. Remove screws and open the case.
3. Locate Microprocessor.
4. Locate and **cut Diode "B".** (see drawing)
5. Reassemble the radio.
6. Reset the microprocesor. (see owners manual)





Remove diode "B"

Receive and Transmit Expansion

Standard C156A

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

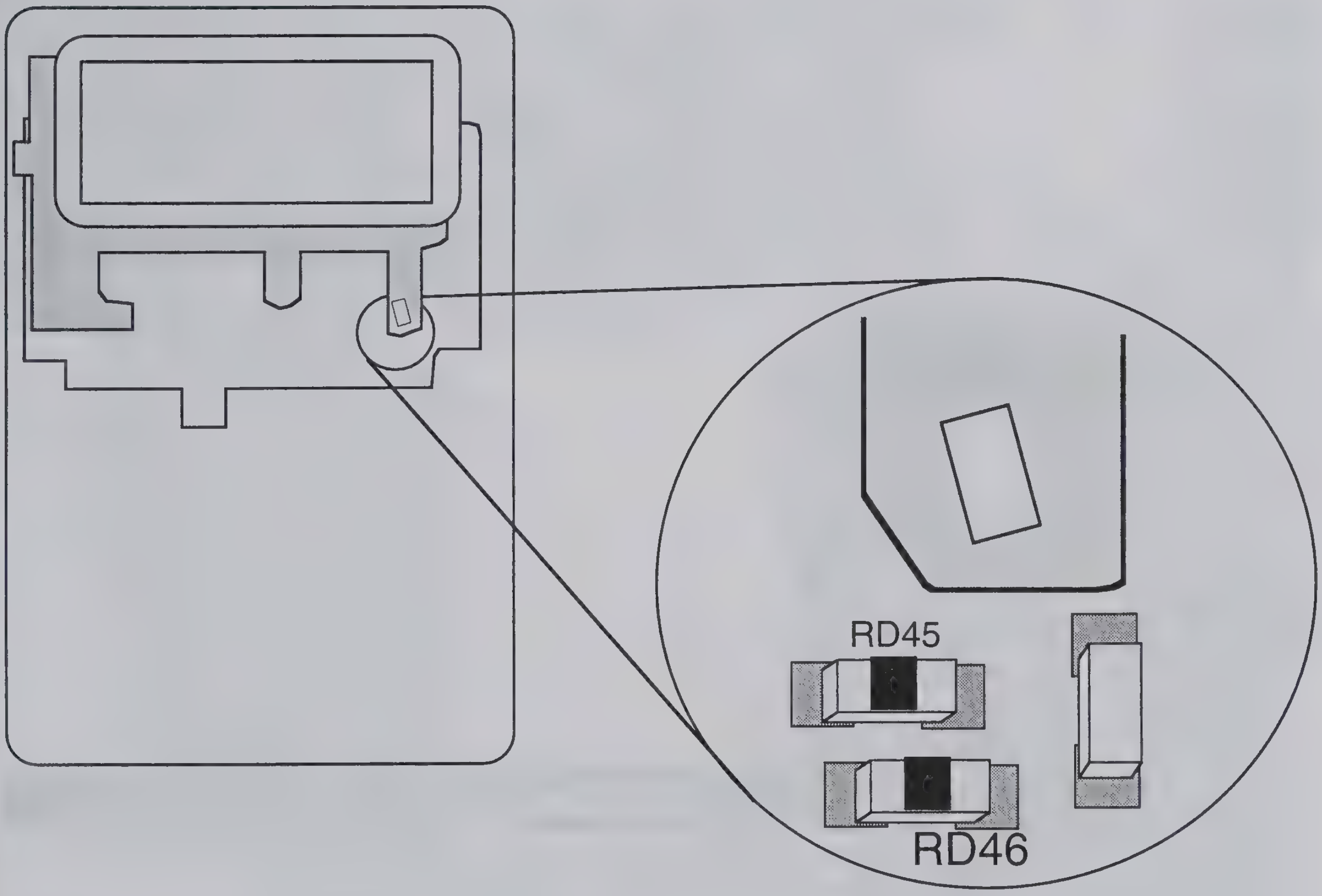
Expansion Range

Not all versions will get full expansion

100 - 199 TX/RX

Modification Instructions

1. Remove Battery and Antenna.
2. Remove two screws from rear case .
3. The front panel will lift off by pressing on sides for the keypad. (BE CAREFUL no to loose 'ZEBRA" connectors)
4. Locate Chip Resistor RD46 (see drawing)
5. **Remove Chip Resistor RD46.** (Note is a very small 100K ohm resistor, not the larger black diode near it.)
6. Reassemble the radio



Receive and Transmit Expansion

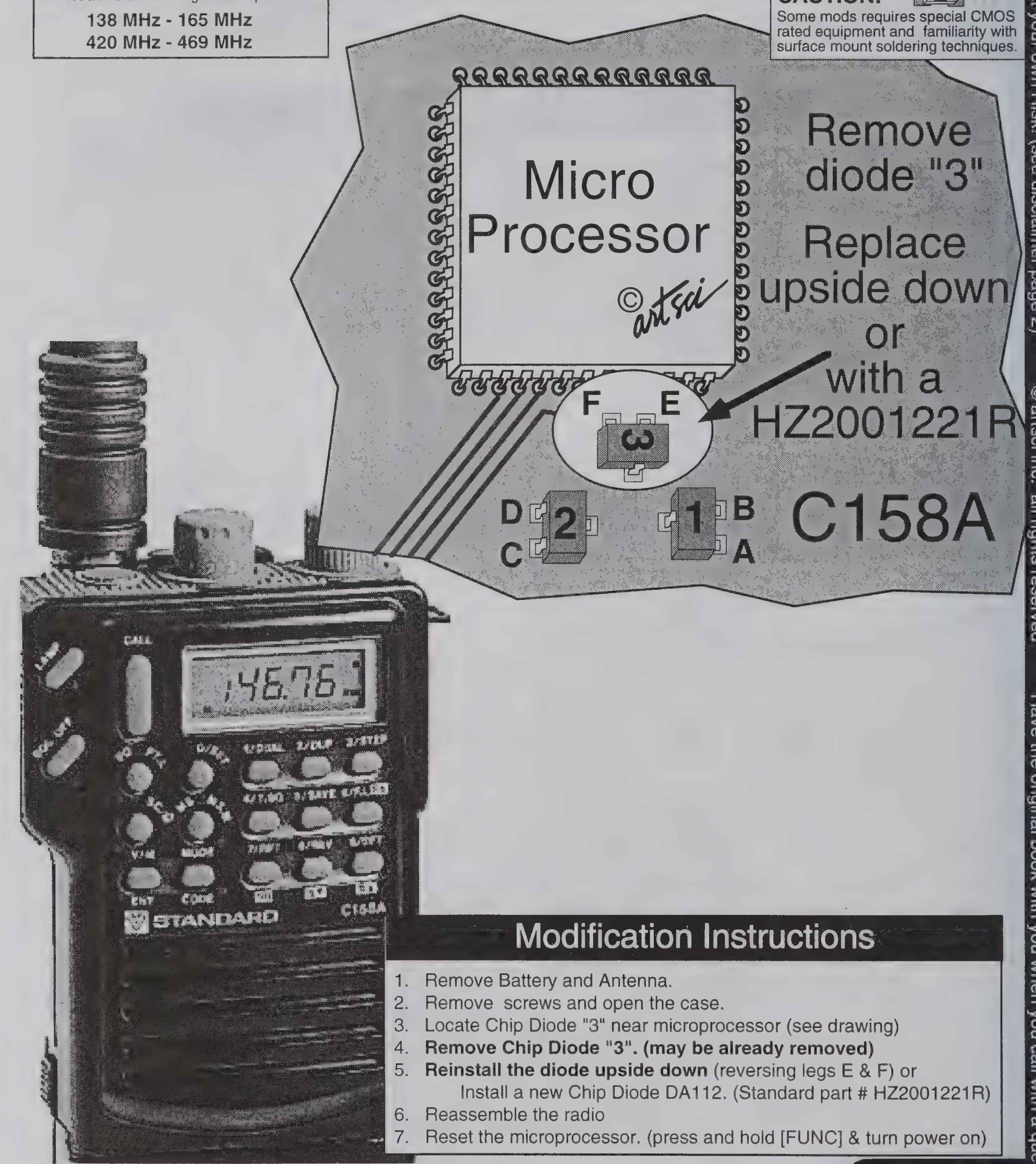
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

138 MHz - 165 MHz
420 MHz - 469 MHz

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Modification Instructions

1. Remove Battery and Antenna.
2. Remove screws and open the case.
3. Locate Chip Diode "3" near microprocessor (see drawing)
4. **Remove Chip Diode "3". (may be already removed)**
5. **Reinstall the diode upside down** (reversing legs E & F) or
   Install a new Chip Diode DA112. (Standard part # HZ2001221R)
6. Reassemble the radio
7. Reset the microprocessor. (press and hold [FUNC] & turn power on)

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Receive and Transmit Expansion

Standard C168A

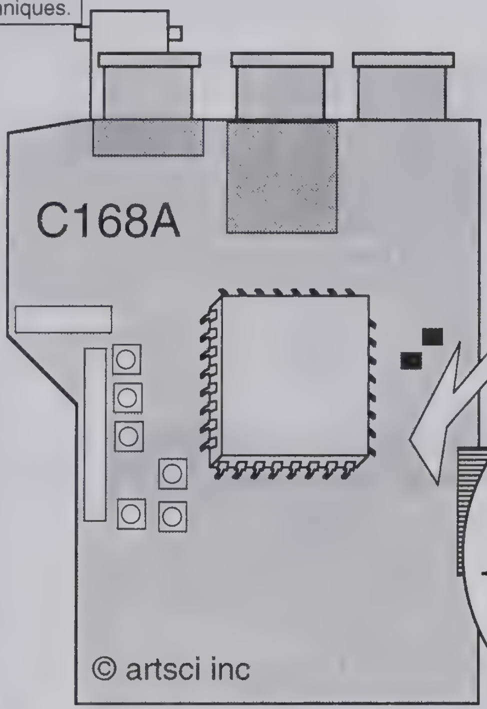
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

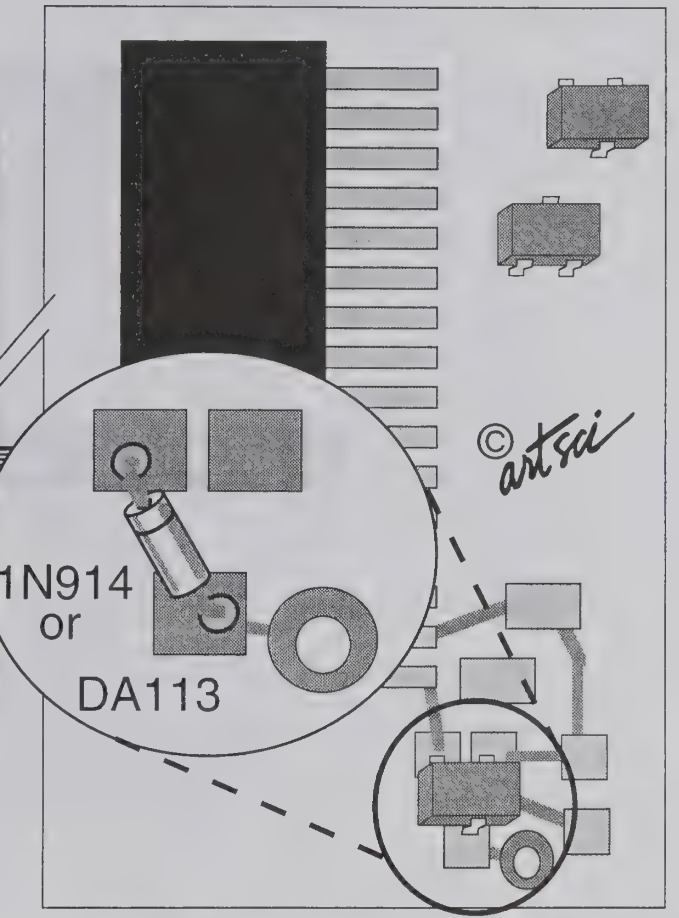
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

120 -180 MHz





Reset Command

1. Switch to the Set Mode.
2. Press and hold [FUNC] & [3]
   (a Dot will appear left of the first digit)
3. Switch to the set mode.
4. Press and hold [FUNC] & [1]
   (the display will blank out and back on)

Modification Instructions

1. Remove Battery and Antenna.
2. Remove screws and open the case.
   (Be careful. Do not break flat cables)
3. Locate microprocessor. (see Drawing)
4. **Install a DA-113 chip diod**e in place.
   (A 1N914 may be used)
5. Reasseble the radio.
6. If required, RESET the microprocessor.

DIRECT FREQUENCY ENTRY

1. Press and hold [F] then [0].
2. Press and hold [F] then [0].
3. Press [8].

AM / FM mode switch

1. Press and hold [F] then [0].
2. Press and hold [F] then [2].

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

57 - 97 MHz RX AM/FM
100 - 175 MHz RX AM/FM
213 - 391 MHz RX AM/FM
115 - 174 MHz TX/RX FM

Expanded Receive Modification

1. Turn Power on.
2. Press [ENT]
3. Press [0], [9].
4. Press [ENT]
5. Press and hold [F] then [0].
6. Press and hold [F] then [ENT].
7. Press and hold [F] then [0].
8. Press and hold [F] then [0].
9. Press and hold [F] then [8].
10. Press [CL]

DIRECT FREQUENCY ENTRY

1. Press and hold [F] then [0].
2. Press and hold [F] then [0].
3. Press [8].

AM / FM mode switch

1. Press and hold [F] then [0].
2. Press and hold [F] then [2].

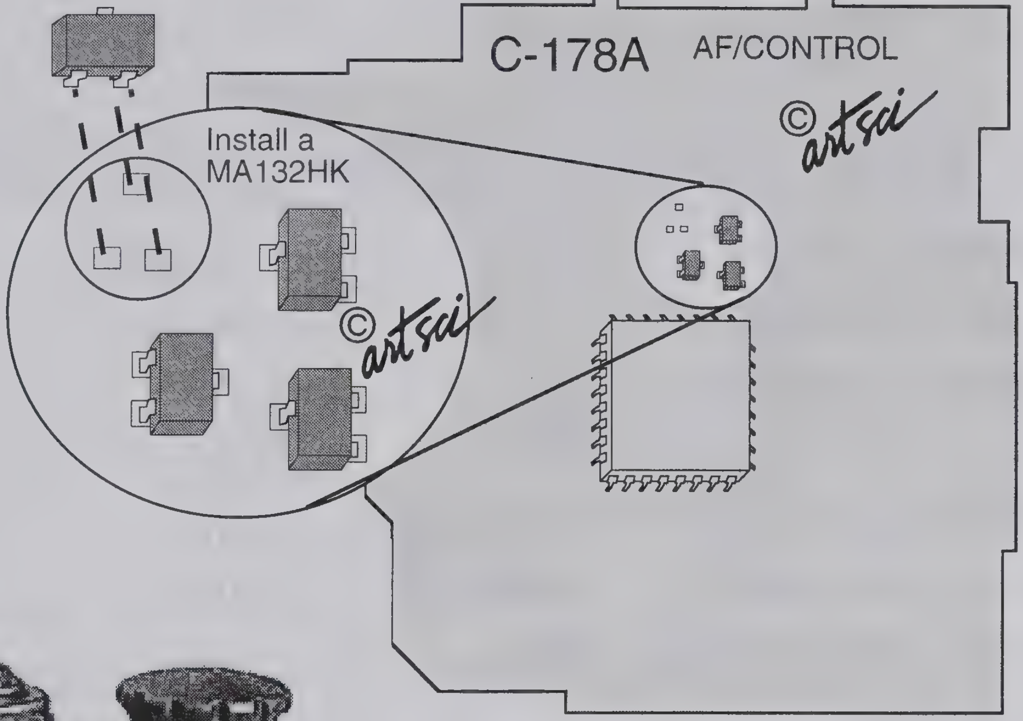
Receive and Transmit Expansion

Standard C178A

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
138 - 165 MHz
420 - 469 MHz



Modification Instructions

1. Remove Battery.
2. Remove 4 screws securing the front case,
   2 on the bottom, 1 on right side and
   1 on the rear case. and open the radio.
3. Locate Control Board.
4 **Locate and install a MA132HK diode package..**
   If there is already a diode package in place, you may be able to flip the diode package over and reinstall it for proper modification.
5. Reassemble the radio.
6. Reset the microprocessor.
   (Press [FUNC] & [SET], turn channel selector to "rst OFF",
   Press [FUNC] & turn channel selector,
   Press [FUNC] & [POWER ON])

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Performance Report

Radio ______________________ Date __________

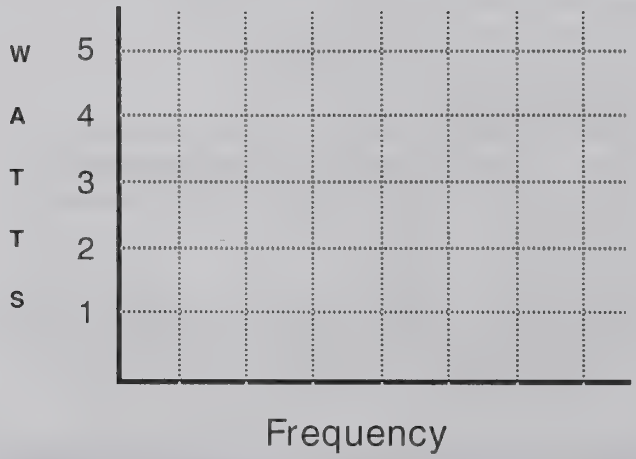
Owner : Name ______________________________

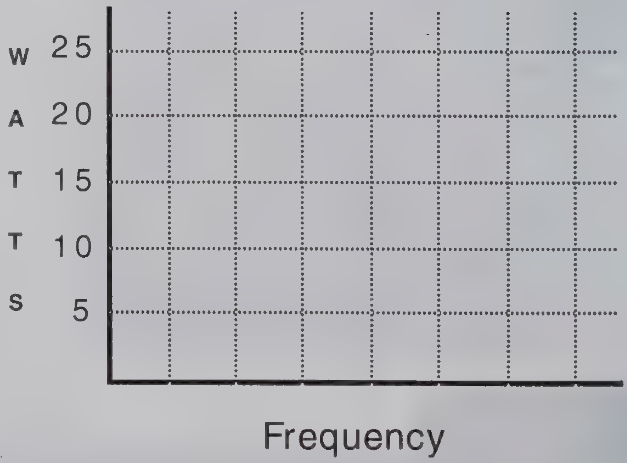
Address ______________________________

City __________________ St. Zip __________

Phone (   )   - ______________________

Description	Before	After
Power out (Low)	________ Watts	________ Watts
Power out (High)	________ Watts	________ Watts
Frequency Error (Simplex)	________ Hz	________ Hz
Frequency Error (Offset)	________ Hz	________ Hz
Receive Sensitivity (Mid-band)	________ uv	________ uv
Receive Sensitivity (____MHz)	________ uv	________ uv
Receive Sensitivity (____MHz)	________ uv	________ uv
PL Deviation	________ Hz	________ Hz
DTMF Deviation	________ KHz	________ KHz
Audio Deviation	________ KHz	________ KHz
Lowest usable Freq @ .5 Pwr	________ MHz	________ MHz
Highest usable Freq @ .5 Pwr	________ MHz	________ MHz





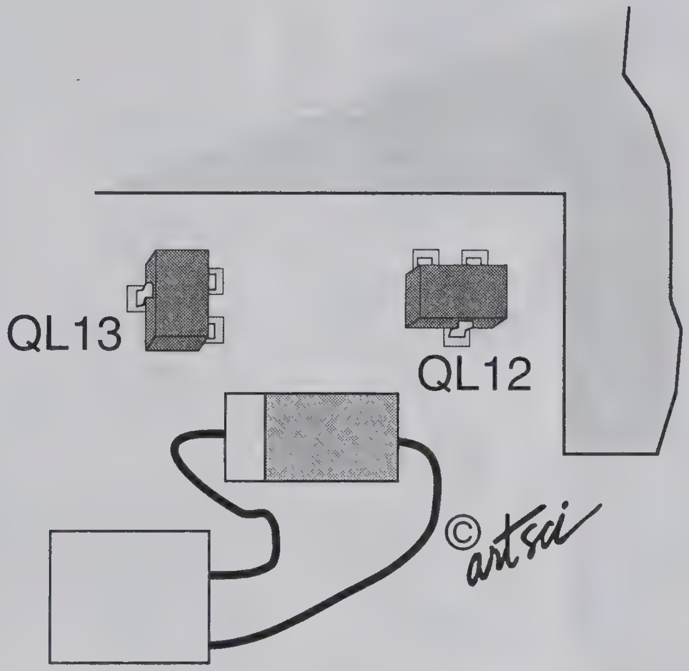
Receive and Transmit Expansion

Standard C188A

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
138 - 165 MHz



Modification Instructions

1. Remove Power and Antenna.
2. Remove screws and open case.
3. Locate the microprocessor board
4. Locate QL12 & QL13. (QL13 may already be missing)
5. **Remove QL12 & QL13**. (QL13 may already be missing)
6. Reassemble the radio
7. **Reset Microprocessor** (set mode 8).

Standard C228A
Standard C288A

Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

RX: 123.5 - 177 MHz
TX: 125 - 174 MHz

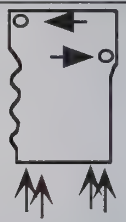
Expansion Range

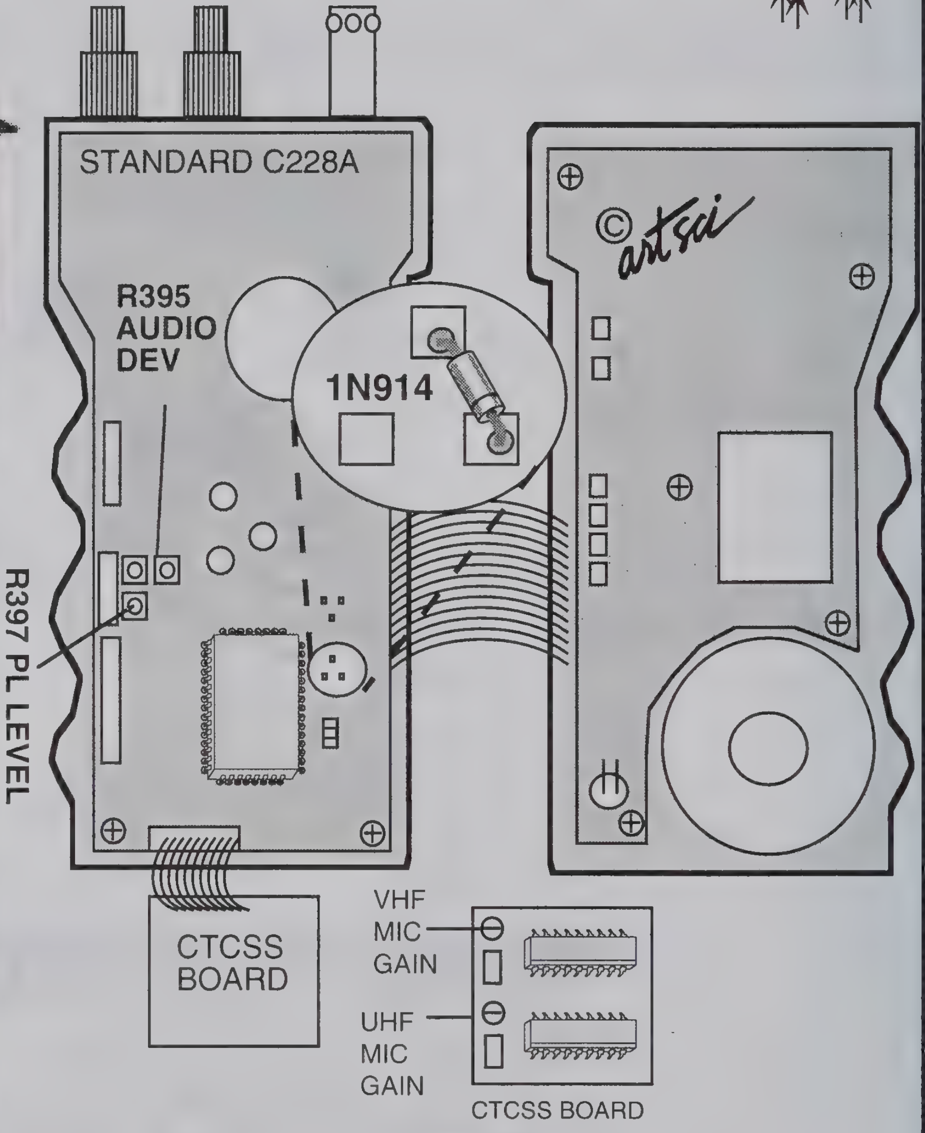
Not all versions will get full expansion

C288: 200 - 250 MHz

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.





Modification Instructions

1. Remove Battery and Antenna.
2. Remove two screws from the back case.
3. Remove the four screws from the battery retaining slide.
4. **Install a 1N914 or DA113 chip diode** in the pictured location.
5. Reassemble the radio.
6. Reset the microprocessor (see owners manual)

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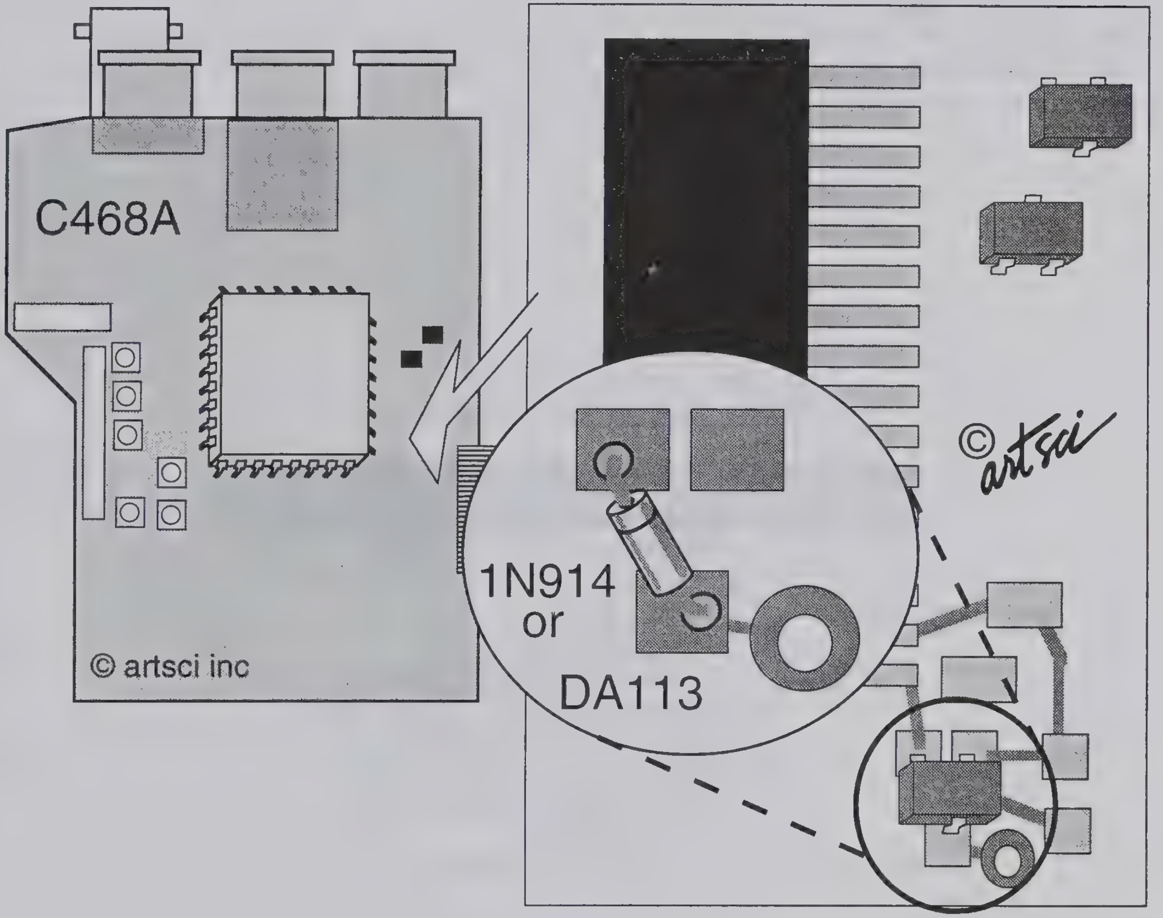
Receive and Transmit Expansion Standard C468A

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
138 - 165 MHz



DIRECT FREQUENCY ENTRY

1. Press and hold [F] then [0].
2. Press and hold [F] then [0].
3. Press [8].

Modification Instructions

1. RemoveBattery and Antenna.
2. Remove screws and open the case. (Be careful. Do not break flat cables)
3. Locate microprocessor. (see Drawing)
4. **Install a DA-113 chip diod**e in place. (A 1N914 may be used)
5. Reasseble the radio.
6. If required, RESET the microprocessor (see instruction manual)

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

340 - 399.995 MHz RX
400 - 474.000 MHZ RX/TX
801 - 980.000 MHz RX

Expanded Receive Modification

1. Turn Power on.
2. Press [ENT]
3. Press [0], [9].
4. Press [ENT]
5. Press and hold [F] then [0].
6. Press and hold [F] then [ENT].
7. Press and hold [F] then [0].
8. Press and hold [F] then [0].
9. Press and hold [F] then [8].
10. Press [CL]

DIRECT FREQUENCY ENTRY

1. Press and hold [F] then [0].
2. Press and hold [F] then [0].
3. Press [8].

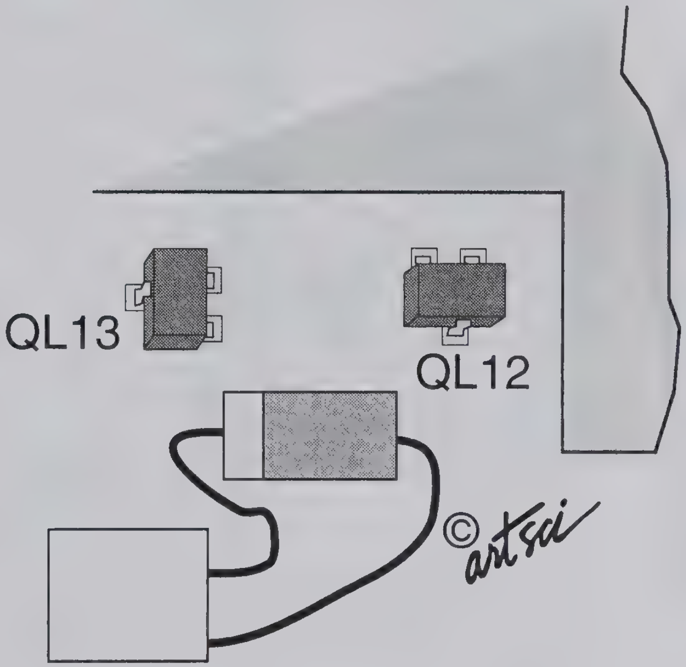
AM / FM mode switch

1. Press and hold [F] then [0].
2. Press and hold [F] then [2].

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
420 - 469 MHz



Modification Instructions

1. Remove Power and Antenna.
2. Remove screws and open case.
3. Locate the microprocessor board
4. Locate QL12 & QL13. (QL13 may already be missing)
5. **Remove QL12 & QL13**. (QL13 may already be missing)
6. Reassemble the radio
7. **Reset Microprocessor** (set mode 8).

Standard C508A Receive and Transmit Expansion

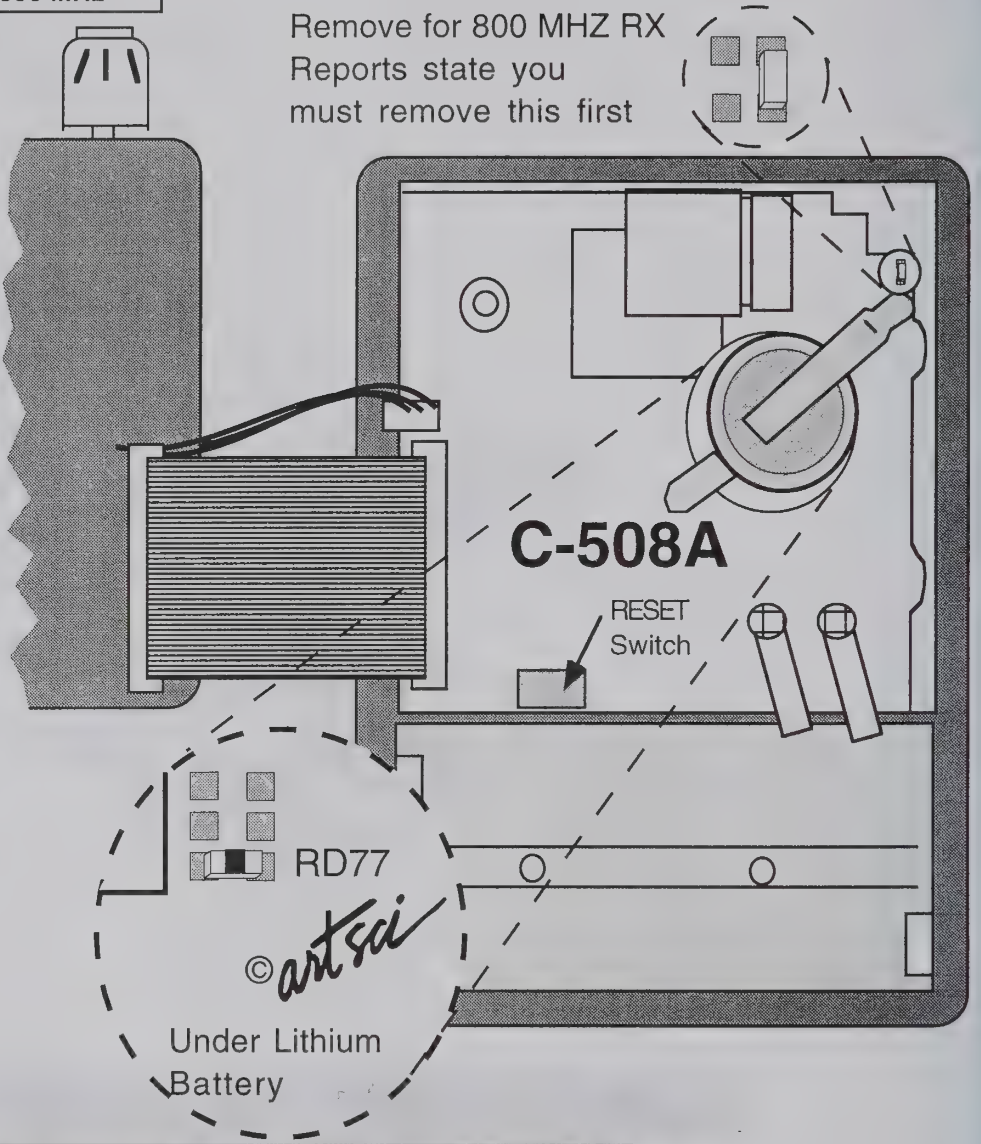
Expansion Range

Not all versions will get full expansion

115 MHz - 164 MHz.
400 MHz - 470 MHz
RX possible: 300 MHz - 399 MHz
800 MHz - 868 MHz
896 MHz - 999 MHz

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Modification Instructions

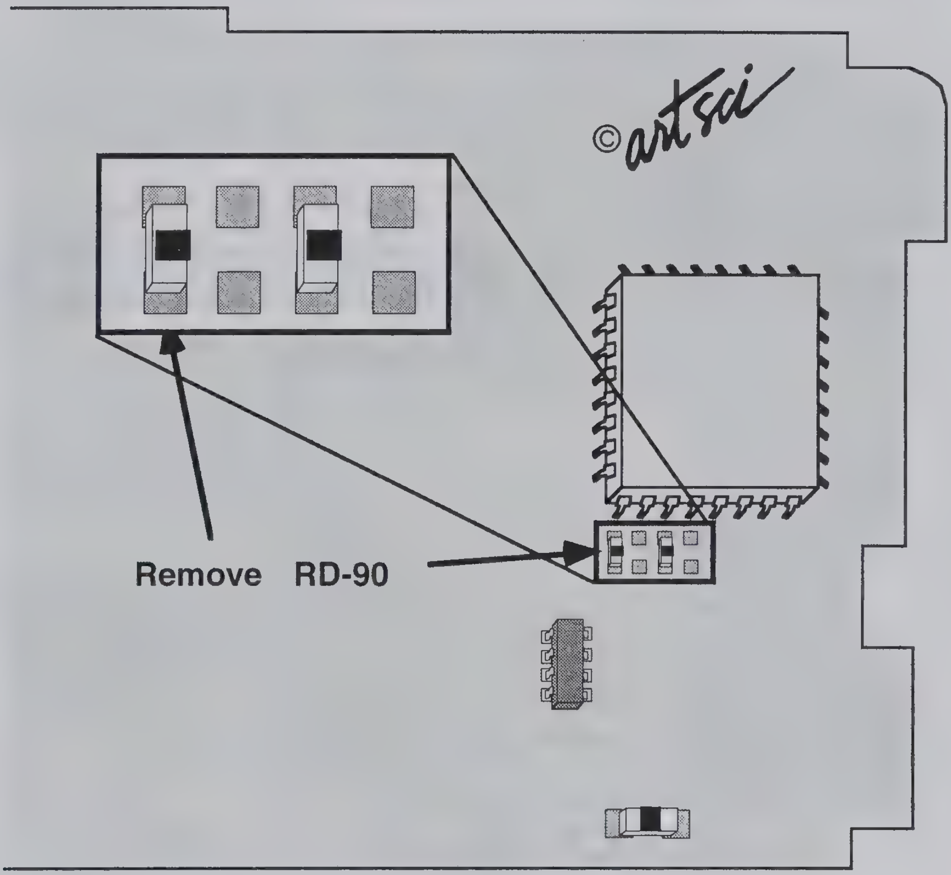
1. Remove Battery.
2. Remove four screws from the radio back half and open the radio.
3. Locate Control Board.
4. Locate and remove the lithium battery (memory will be erased)
5. **Locate and remove 800 MHz Resistor** (see Diagram)
6 **Locate and remove chip resistor RD77**. (see Drawing)
7. Locate and remove component (see drawing)
8. Replace lithium battery.
9. Press reset switch SD30. (see Manual for location)
10. Reassemble the radio.

Receive and Transmit Expansion — Standard C-510

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

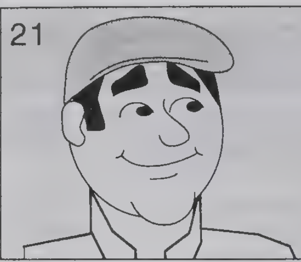
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
Unknown at Press Time



Modification Instructions

1. Remove Battery.
2. Remove four screws from the radio back half and open the radio.
3. Locate Control Board.
4. **Locate and remove chip resistor RD90** (see Drawing)
5. Press reset switch. (see Manual for location)
6. Reassemble the radio.



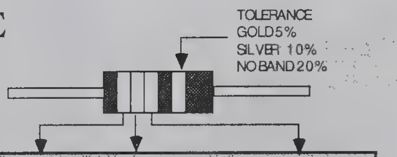
BOB Simpleton's Guide to Color codes

As seen in the ***Amateur Radio Trader***

The electronic industry created a standard for color coding parts many, many years ago. The same color code is used on all different types of components. With a little effort, and a good memory, the basic color code can be memorized. In color code sequence is: BLACK, BROWN, RED, ORANGE, YELLOW, GREEN, BLUE, VIOLET, GRAY and WHITE. The number sequence that corresponses with the color code starts with zero; Black=0, Brown=1, Red=2, etc.

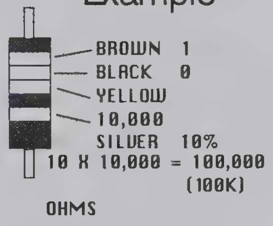
Components using color stripes and surface mount components use the 'significant' digit system paired with a multiplier digit, based on the powers of ten. An additional color stripe is also used to determine the accuracy or tolerance of the component. Higher accuracy components requires more significant digits to accurately describe the value. 5% accuracy parts use two 2 significent digits colors stripes followed by the multliper color stripe. 2% and 1% components often use 3 significent digit colors stripes .

RESISTOR COLOR CODE



COLOR	1st DIGIT	2nd DIGIT	MULTIPLY BY
BLACK	0	0	1
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
VIOLET	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	1,000,000,00
GOLD			0
SILVER			.1
			.01

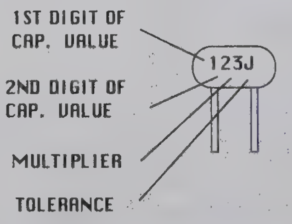
Example



Resistor standard values (significant digits)

10	brown	black	33	orange	orange
11	brown	brown	36	orange	blue
12	brown	red	39	orange	white
13	brown	orange	43	yellow	orange
15	brown	green	47	yellow	purple
16	brown	blue	51	green	brown
18	brown	gray	56	green	blue
20	red	black	62	blue	red
22	red	red	68	blue	gray
24	red	yellow	75	purple	green
27	red	purple	82	gray	red
30	orange	black	91	white	brown

CAPACITORS



MULTIPLIER		TOLERANCE		
	MULTIPLY BY		10pF or less	over 10pF
0	1	B	0.1pF	
1	10	C	0.25pF	
2	100	D	0.5pF	
3	1,000	F	1.0pf	1%
4	10,000	G	2.0pf	2%
5	100,000	H		3%
		J		5%
8	.01	K		10%
9	0.1	M		20%

Most common resistors are in the 5 to 10% tolerance range. Silver is used for 10% and gold is used for 5%. 20% resistors have no tolerance color bar.

One very common resistor is color coded: red red orange gold. Take a moment and see if you can use the attached resistor table and calculate the value..

If you calculated a 22,000, 5% resistor, you are correct. It is calculated like this: $22 \times 10^3 = 22{,}000$. What possible readings would you expect if you connected this resistor to an ohm meter?

Since it is a 5% tolerance resistor, the measured value will be between 19.800 and 24,200 ohms. That is calculated be allow 5% above and below the stated value.

Surface mount resistors do not use color stripes. The 2 significent digits and multiplier digit are printed right on the top of the component. These components are very, very small. The printed digits are often so small, you may need a magnifying glass to read them.

A surface mount resistor marked 103 would be a 10,000 ohm resistor (10k ohms). For everyone interested in mathematics, the formula is $10 \times 10^3 = 10{,}000$

A little practice will make reading resistors and other electronic componets easy as pi. 73, Bob

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Receive and Transmit Expansion — Standard C528A

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

RX&TX - 125.75 MHz - 176.150 MHz
400 MHZ - 473.750 MHz

RX - 821 MHz - 899.9875 Mhz
900 MHz - 976 MHz

Modification Instructions

1. Turn Power on.
2. Push RESET.
   Small 'dimple' under key that holds the handstrap
3. Press and hold [FUNCTION] then [0]
4. Press and hold [FUNCTION] then [ENT]
5. Press PTT Briefly.
6. Press [UHF]
7. Press and hold [FUNCTION] then [LAMP]
8. Press and hold [FUNCTION] then [0]
9. Press and hold [FUNCTION] then [CODE]
10. Press and hold [FUNCTION] then [3]
11. Press PTT Briefly.
12. Press [VHF]
13. Press and hold [FUNCTION] then [STEP]
14. Select 12.5 KHz. (Use Selector Knob)
15. Press PTT Briefly.
16. Press and hold [FUNCTION] then [8]
17. Press and hold [FUNCTION] then [8]
18. Press and hold [FUNCTION] then [7]
19. Press and hold [FUNCTION] then [7]
20. Press and hold [FUNCTION] then [MS.M]
21. Select 144.9825 MHz (Use Selector Knob)
22. Press and hold [FUNCTION] then [0]
23. Press and hold [FUNCTION] then [ENT]
24. Press PTT Briefly.
25. Press and hold [FUNCTION] then [8]
26. Press and hold [FUNCTION] then [MS.M]
27. Press and hold [FUNCTION] then [LAMP]

F0 + F1 : 2 Second Tail per Crossband Repeater
F0 + F2 : Tone Squelch Scan/ Stop
F0 + F3 : Steps between bands
F0 + F4 : Allows entry of 10 MHz digit
F0 + F5 : Voice Output mute
F0 + F6 : Change rotart Tuning 100 kHz & 1 MHz
F0 + F7 : Switch between DTMF & Paging Tones
F0 + F8 : Crossband Repeater
F0 + F9 : 10 MHz stepping with arrows
F0 + Fv : DTMF Cloning Do both radios Press PTT
F0 + FV/m + PTT : Expanded RX
FL + F0 + FPag + FL + F3 + PTT: 800 RX

To Receive 300 - 400 Mhz or 800 - 900 MHz

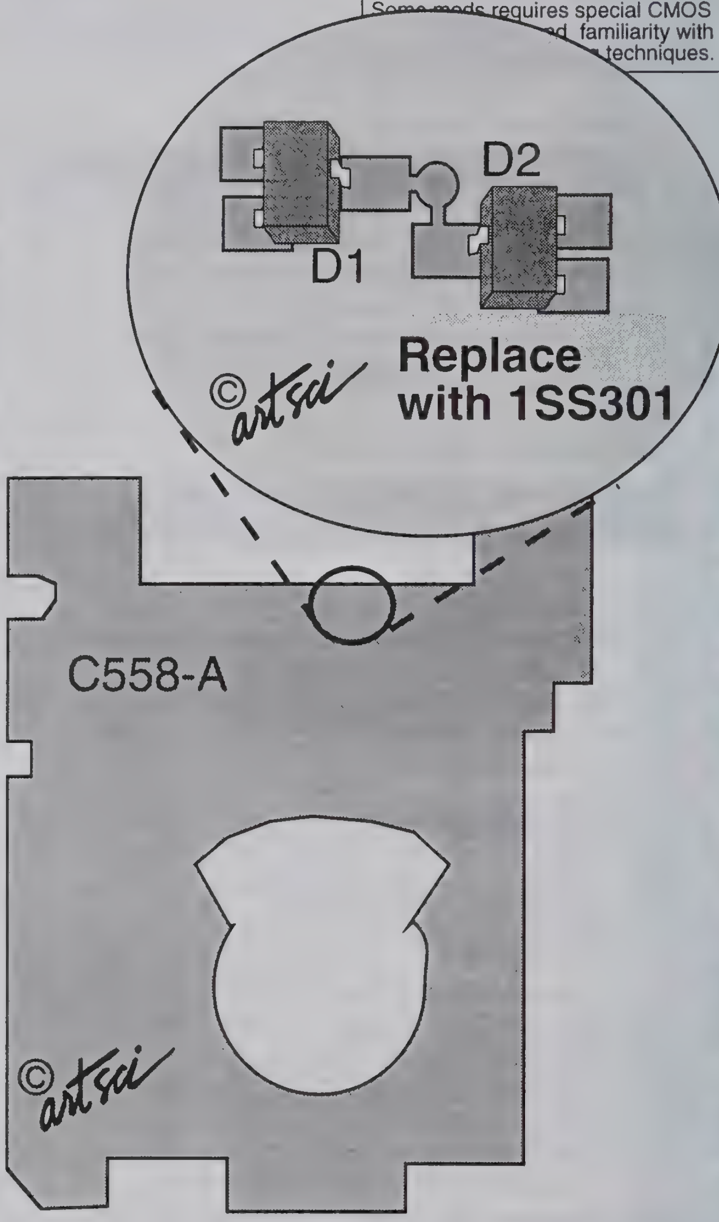
Press [UHF]
Press and hold [FUNCTION] then [SET]
Press and hold [FUNCTION] then [3] to Select Bands

Standard C-558A Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS … ed. familiarity with … techniques.



Expanded RF Modification

1. Remove Battery and antenna.
2. Locate and remove body screws and open the case.
3. Locate and unsolder the copper plate from the back side of the LCD display.
4. Locate and **remove chip diode D2.** (see drawing)
5. **Attach a 1SS301 chip diode in the vacant D2 position.**
   (You can order this diode direct from STANDARD)
6. Reassebmle the radio.
7. Reset the microprocessor, if required.

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Receive and Transmit Expansion

Standard C568A

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

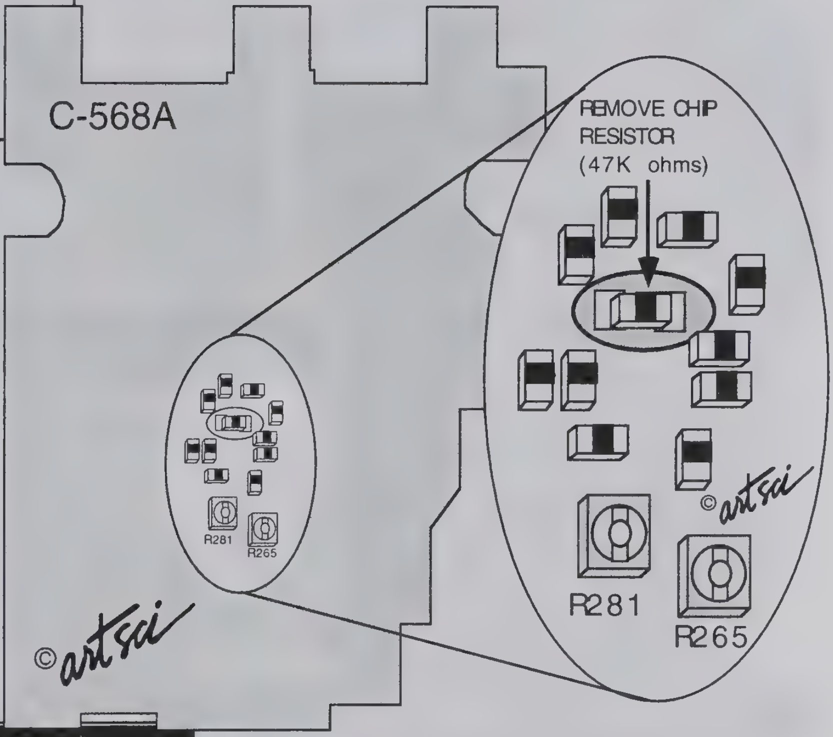
Not all versions will get full expansion

100-200 MHz / 330-500 RX

118 - 193 TX / 400 - 485 TX

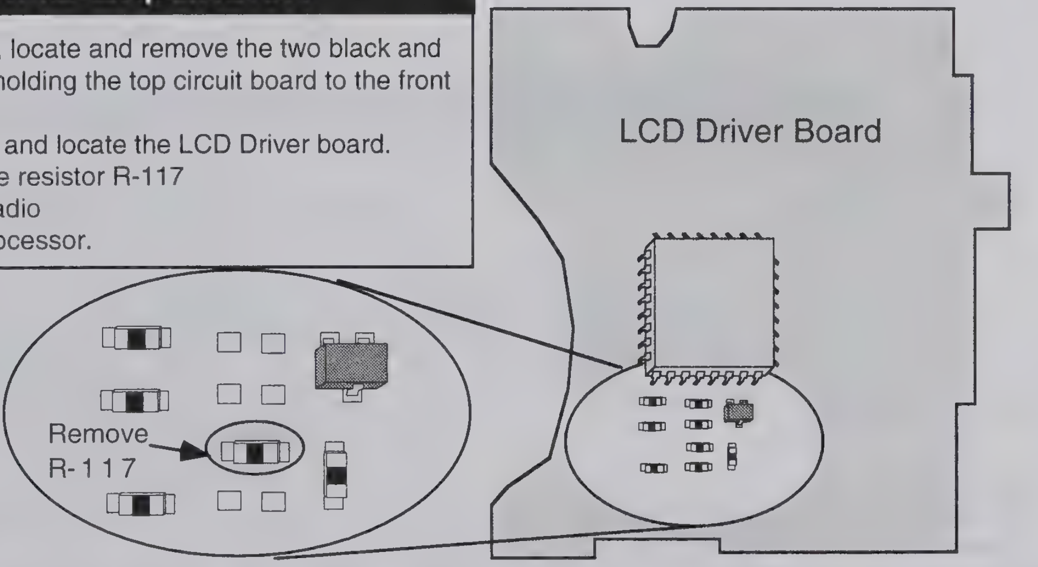
Modification Instructions

1. Remove Battery.
2. Remove Screws and open the radio.
3. Locate Control Board.
4 **Locate and remove 47K Chip resistor**. (see Drawing)
5. Reassemble the radio.
6. Reset the microprocessor. (ALL RESET, see user manual)



800 MHz Expansion

1. While open above, locate and remove the two black and two silver screws holding the top circuit board to the front of the case.
2. Carefully lift board and locate the LCD Driver board.
3. Locate and remove resistor R-117
4. Reassemble the radio
5. Reset the microprocessor.



Standard C628A Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

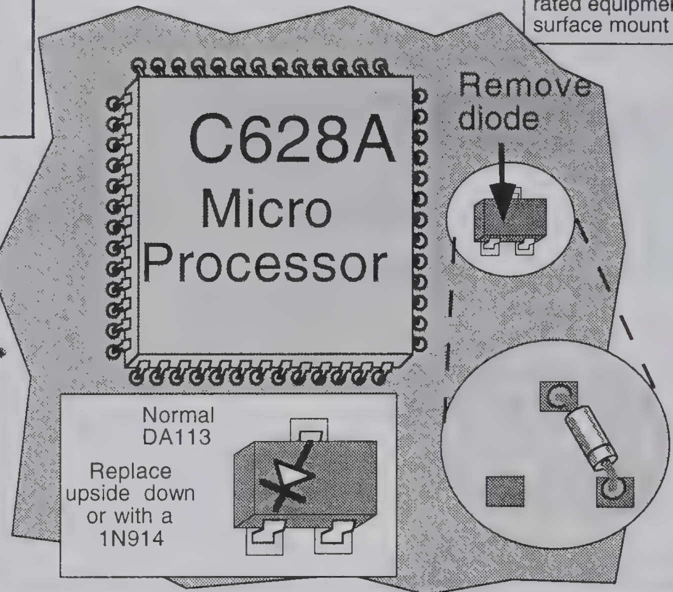
Expansion Range

Not all versions will get full expansion

RX -	320 - 480 MHz
	820 - 980 MHz
	1220 - 1400 MHz
TX/RX -	400 - 474 Mhz
	1220 - 1340 MHz

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Expanded RF Modification

1. Remove Battery and antenna.
2. Locate and remove body screws and open the case.
3. Locate Microprocessor.
4. Locate DA113 chip Diode. (see drawing)
5. **Remove chip Diode DA113.**
6. **Reinstall the Diode upside down or with a 1N914 diode.**
7. Reassemble the radio.
8. Reset the microprocessor if required. (see owners manual)

Expanded Rx Modification

1. Turn Power on.
2. Push RESET.
   Small 'dimple' under key that holds the handstrap
3. Press and hold [450] key
4. Press and hold [FUNCTION] then [0]
5. Press and hold [FUNCTION] then [D]
6. Press PTT Briefly.
7. Press and hold [1200] key
8. Press and hold [FUNCTION] then [LAMP]
9. Press and hold [FUNCTION] then [0]
10. Press and hold [FUNCTION] then [B]
11. Press and hold [FUNCTION] then [LAMP]
12. Press and hold [FUNCTION] then [3]
13. Press PTT Briefly.

To toggle bands:

Press and hold [FUNCTION] then [0]
Press and hold [FUNCTION] then [3]

Expanded Rx Modification

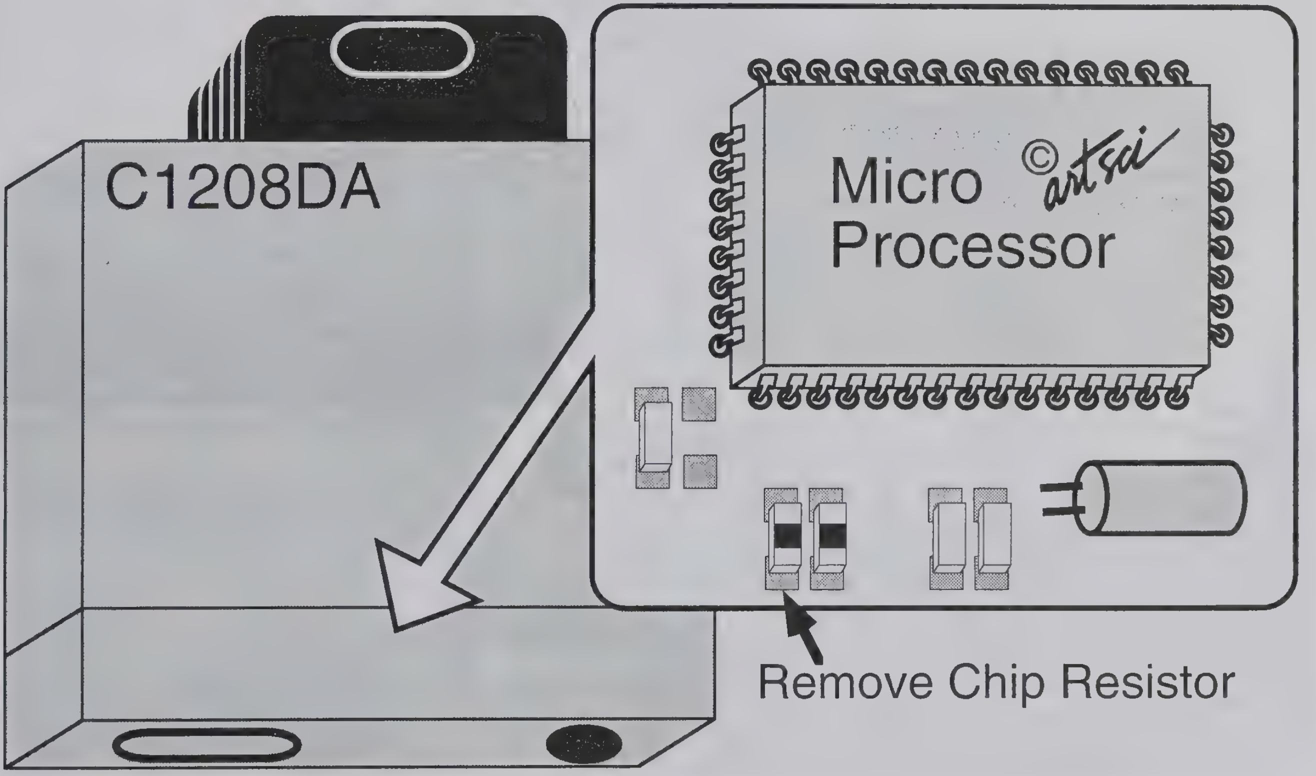
Do after the RX mod

1. Press and hold [1200] key
2. Press and hold [FUNCTION] then [B]
3. Press [5] key
4. Press [2] key
5. Press [0] key
6. Press and hold [450] key
7. Press and hold [FUNCTION] then [B]
8. Press [6] key
9. Press [2] key
10. Press [0] key
11. Press and [FUNCTION] then [4]
12. Press and [FUNCTION] then [450] key
13. Press and hold [FUNCTION] then [0]
14. Press and hold [FUNCTION] then [D]
15. Press PTT Briefly.

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
138 - 165 MHz
420 - 469 MHz



Modification Instructions

1. Remove power and antenna.
2. Remove four screws and open top cover.
3. Locate microprocessor.
4. Locate chip resistor. (see drawing)
5. **Remove chip resistor** using caution not to melt the front case plastic.
   (YOU MAY WISH TO REMOVE THE FRONT CASE FOR CLEARANCE)
6. Reassemble the radio.
7. Reset the microprocessor if required.

Standard C5608DA RX/TX Expansion / 800 MHz RX Mod

Expansion Range

Not all versions will get full expansion

138 - 165 MHz

420 - 469 MHz

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

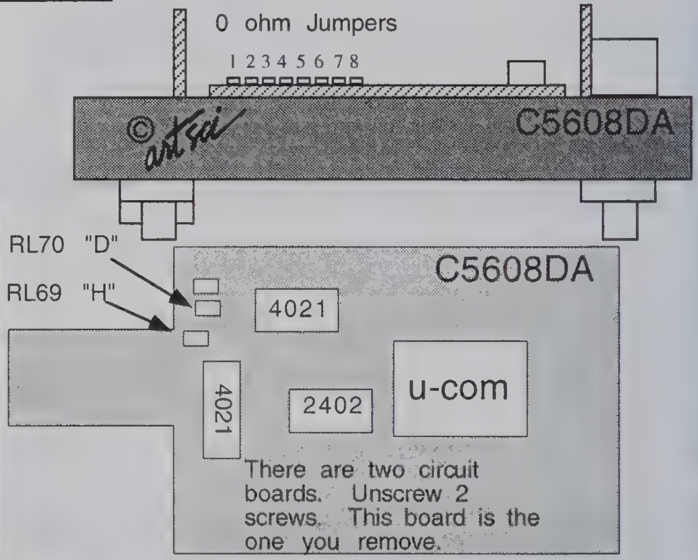
Expanded RF Modification

1. Remove power and antenna.
2. Remove 0 ohm resistors near the microprocessor.

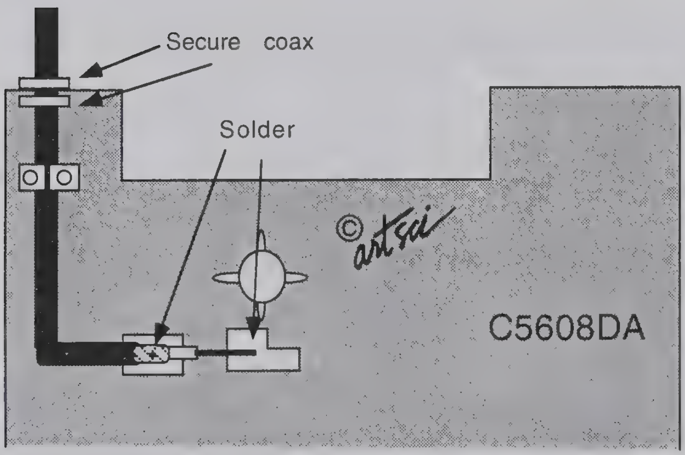
Specific data:

RL69 "H" symbol	400-469.996 MHz TX 250-499.995 MHz RX
RL70 "D" symbol	130-173.995 MHz TX 100-199.995 MHz RX

3. Reassemble the radio.
4. Reset the microprocessor (if required)



There are two circuit boards. Unscrew 2 screws. This board is the one you remove.



Modification Instructions

1. Remove power and antenna.
2. Remove covers
3. Remove black tape patch under the VHF antenna connector.
4. Remove cover from transmitter (5 screws)
5. Remove screws securing the red and black power wires.
6. **Solder attach the new antenna coax as shown.**
7. Secure the coax using wire ties or other method.
8. Replace the power cable screws.
9. Replace the covers.

800 MHz activation:

Select 440 as the main band.
Press [UP] button while pressing the rotary switch
Press [UP] button while pressing the [FUNCTION] button.
To Return to 440 - Press [DOWN] while pressing [FUNCTION] button.

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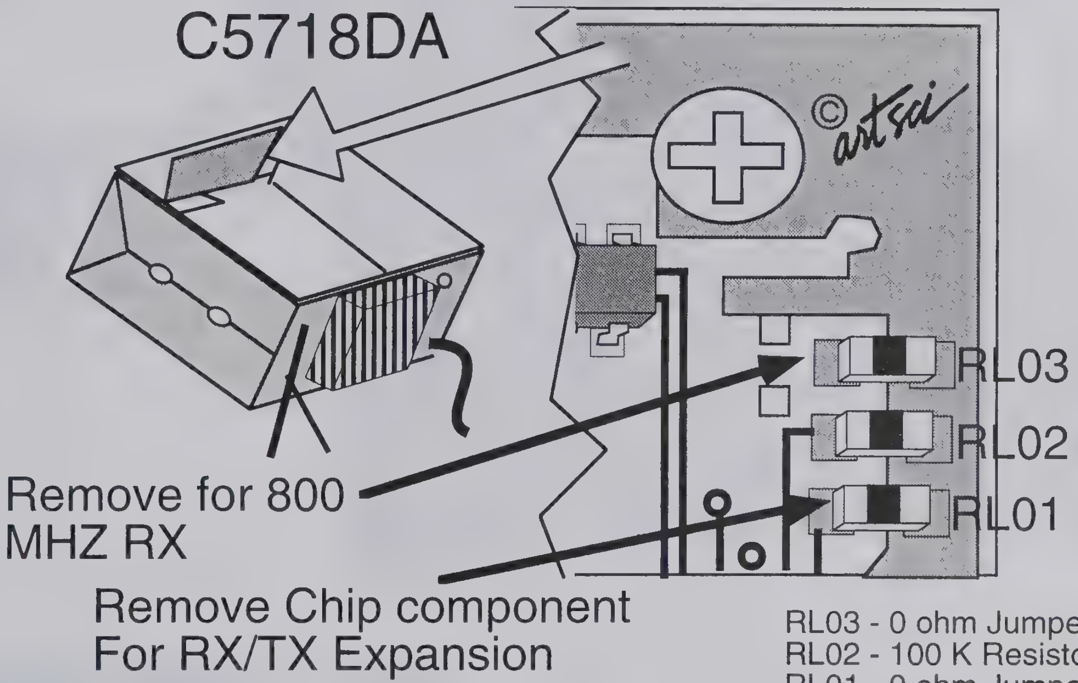
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
138 - 165 MHz
420 - 469 MHz



RL03 - 0 ohm Jumper
RL02 - 100 K Resistor
RL01 - 0 ohm Jumper

Expanded RF Modification

1. Remove power and antenna.
2. Remove four screws and remove top cover.
3. Locate vertical board on the front of the radio.
4. Locate three BLUE chip resistors. (Right side of connector labled "CTD")
5. **Remove lower most chip resistor** (see drawing)
6. Reassemble the radio
7. Reset the microprocessor. (see owners manual)

Standard C5900DA Receive and Transmit Expansion

Expansion Range

Not all versions will get full expansion

46 Mhz - 60 Mhz
100 Mhz - 174 Mhz
345 Mhz - 495 Mhz

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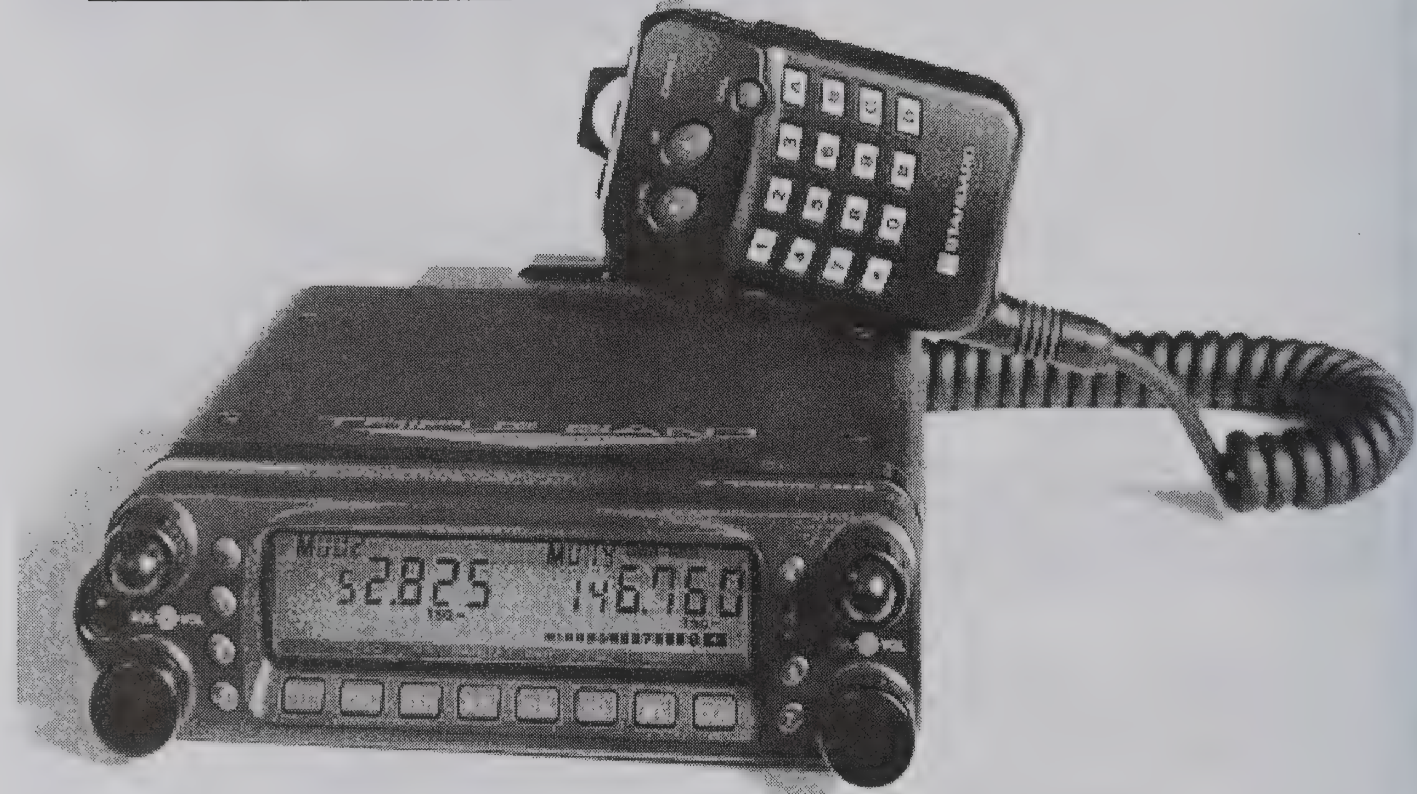
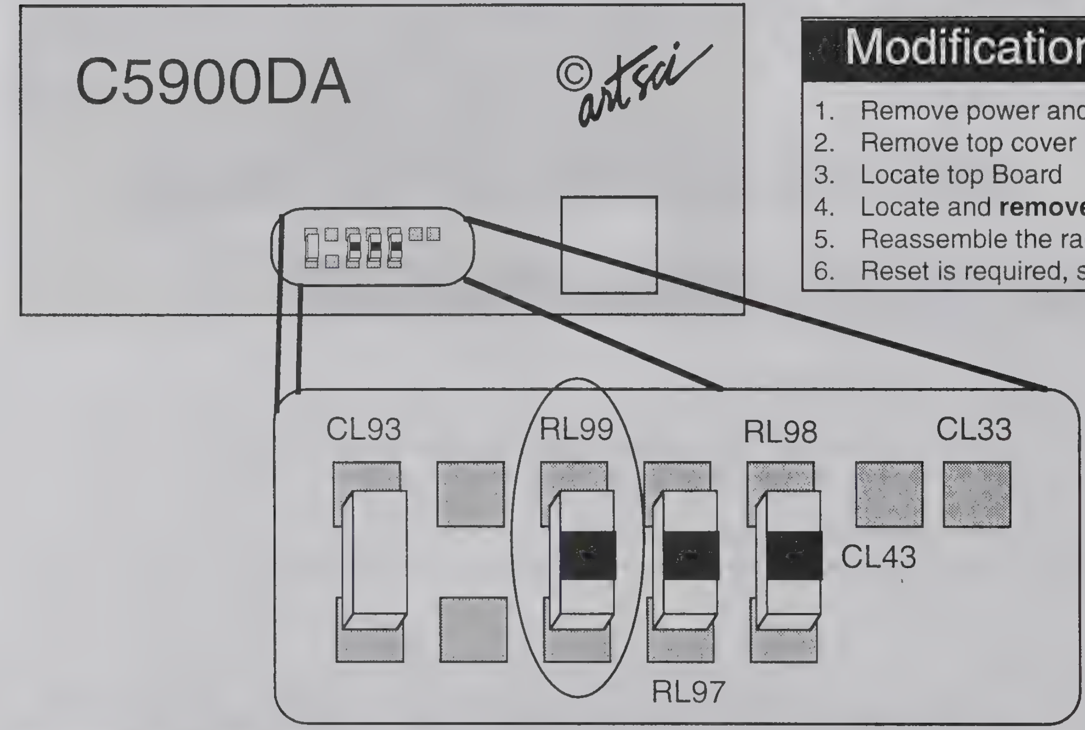
CAUTION:

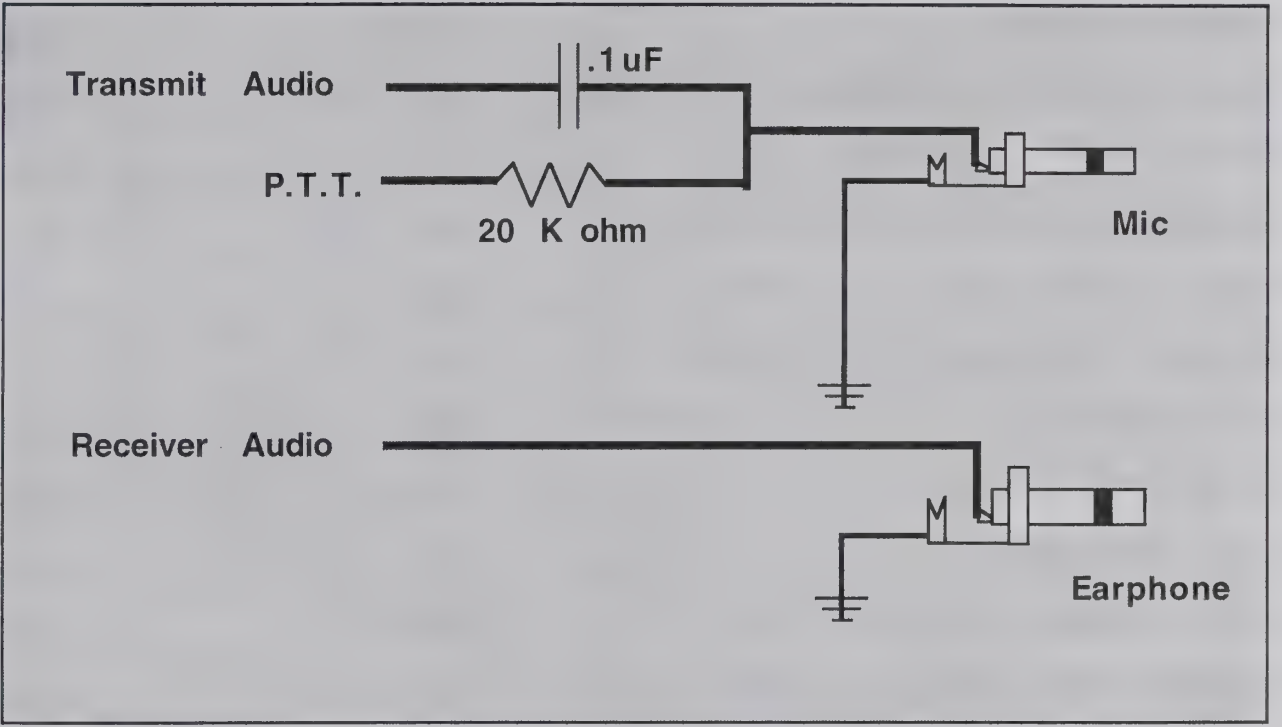
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.





Modification Instructions

1. Remove power and antenna.
2. Remove top cover
3. Locate top Board
4. Locate and **remove Resistor RL99**
5. Reassemble the radio
6. Reset is required, see user manual.

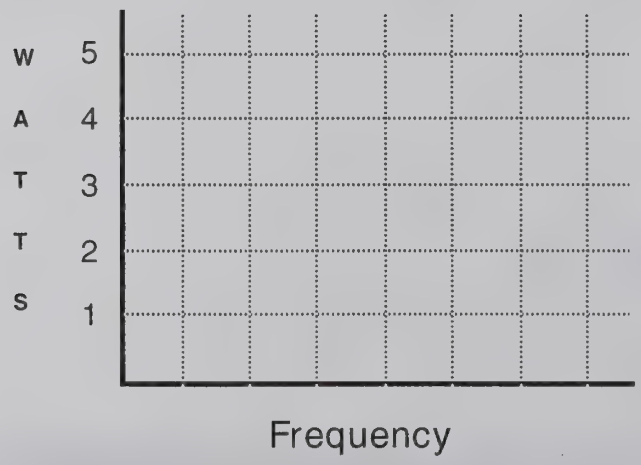

Transmit Audio
.1 uF
P.T.T.
20 K ohm
Mic
Receiver Audio
Earphone

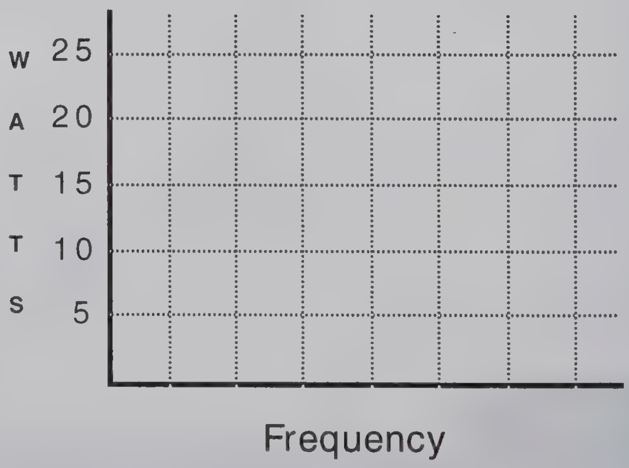
Performance Report

Radio ______________________ Date ____________

Owner : Name ______________________________
Address ______________________________
City ______________ St. Zip ______________
Phone ( ) -

Description	Before	After
Power out (Low)	________ Watts	________ Watts
Power out (High)	________ Watts	________ Watts
Frequency Error (Simplex)	________ Hz	________ Hz
Frequency Error (Offset)	________ Hz	________ Hz
Receive Sensitivity (Mid-band)	________ uv	________ uv
Receive Sensitivity (____MHz)	________ uv	________ uv
Receive Sensitivity (____MHz)	________ uv	________ uv
PL Deviation	________ Hz	________ Hz
DTMF Deviation	________ KHz	________ KHz
Audio Deviation	________ KHz	________ KHz
Lowest usable Freq @ .5 Pwr	________ MHz	________ MHz
Highest usable Freq @ .5 Pwr	________ MHz	________ MHz





Other Radio Modifications

Mfg.	Radio	Modification	Page #
ADI	AR-146	Expanded RF	Other - 2
	AT-18	Expanded RF	Other - 3
	AT-200	Expanded RF	Other - 3
	AT-201	Expanded RF	Other - 4
	AT-400/48	Expanded RF	Other - 5
	AT-600	Expanded RF	Other - 6
AMERITRON	AL-80/A/B	Expanded RF	Other - 26
	AL-82	Expanded RF	Other - 26
	AL-572	Expanded RF	Other - 26
	AL-800/H	Expanded RF	Other - 26
	AL-811/H	Expanded RF	Other - 26
	AL-1200	Expanded RF	Other - 26
	AL-1500	Expanded RF	Other - 26
AZDEN	AZ-21, AZ-61	Expanded RF	Other - 7
	PSC-6000	Expanded RF	Other - 8
	PSC-7000	Expanded RF	Other - 8
	PSC-7500	Expanded RF	Other - 8
HEATH	H-2 Mini HT	Expanded RF	Other - 21
	H4-HT	Expanded RF	Other - 22
	HW-24	Expanded RF	Other - 23
	HW24HT	Expanded RF	Other - 24
	SB-1400	Expanded RF	Other - 25
KDK	KDK-240	Expanded RF	Other - 9
	KDK-2033	Expanded RF	Other - 9
MIDLAND	73-030	Expanded RF	Other - 10
MAGNUM	130	Expanded RF	Other - 30
	257, 357DX, 457DX	Expanded RF	Other - 31
	502	Expanded RF	Other - 32
	SSB-10	Expanded RF	Other - 29
	Millennium 2002, 2003	Expanded RF	Other - 27
	Alpha / Delta Force	Expanded RF	Other - 28
TANDY	HTX-100	Expanded RF	Other - 11
RANGER	AR-3300, AR-3500	Expanded RF	Other - 12
RCI	RCI-2950	Expanded RF	Other - 13
	RCI-2970	Expanded RF	Other - 13
SENDER	TR-145/450	Expanded RF	Other - 14
SGC	GS-2020	Expanded RF	Other - 20
TEN TEC	PARAGON	Expanded RF	Other - 15
UNIDEN	HR-2500	Expanded RF	Other - 19
	HR-2510	Expanded RF	Other - 18
	HR-2600	Expanded RF	Other - 18
Dragon	RPSY-201	Expanded RF	Other - 16
	RPSY-497	Expanded RF	Other - 17

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

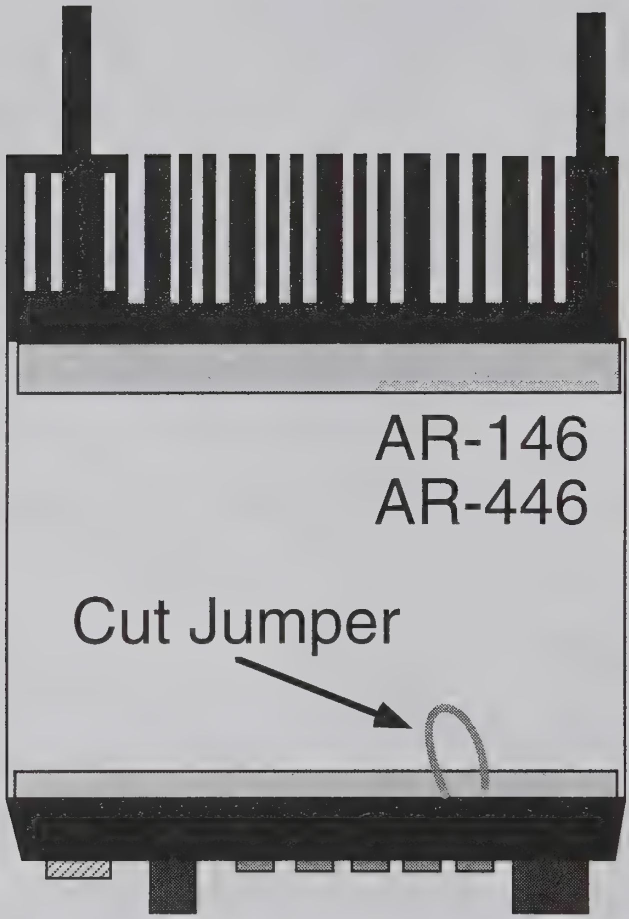
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

125 - 174 MHz AR-146

430 - 169 MHz AR 446



Modification Instructions

1. Remove Bottom Cover
2. Locate and cut Wire jumper
3. Reassemble the radio.

Receive and Transmit Expansion

ADI AT-18 / AT-200

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

130-163.995 MHz

Modification Instructions

1. Press and Hold [F] and turn power on. (display will read 145.00) (This will reset all memories!!)
2. Turn Power off
3. Press and hold [3] and turn power on. (display will read 145.00)
4. Press [F] & [3]. (Display will read 10)
5. Change step to 05 by turning dial one step.
6. Press [F] & [9]. (Display will read 00.60)
7. Press and hold [F] and turn dial until display reads 30.60 [50].
8. Release [F] key and rotate dial until the display reads 30.63 [50].
9. Press [F] & [3] and change step back to 10.
10. Press [F] & [0]. (display should read 145.00)
11. Press [7]. (display should read ".")
12. Press [3] [0] [6] [3] transmit & receive expansion
    or
    Press [3] [0] [7] [3] receive expansion only.
13. Press [*] (display should read 130.00)
14. Press [F] & [9] (display should read 30.63 [50])
15. Press and hold [F] and turn dial until display reads 00.63 [50].
16. Release [F] and turn dial until it reads 00.60.
17. Press [*]. (display should read 130.00)
18. Turn radio off and back on.

Note : Use [F] and [MHz] key to change frequency stepping.

ADI AT-201

Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

130 - 163.995 MHz

Modification Instructions

--- Receive expansion ---

1. Press and Hold [F] and [CALL] and turn power on.
2. Press and Hold [F] and [CALL]. The display will read 145.00
3. Turn Power off
4. Press and hold [3] and [CALL] and turn power on.
   (display will show a 3)
5. Turn radio off and back on. The display will go from 100-179 RX and
   lock between 130-170 MHz. TX is limited to 144-148 MHz

--- Transmit expansion ---

6. Press [F] & [3]. (Display will read 10) This is the freq step rate.
7. Change step to 05 by turning dial one step.
8. Press [F] & [9]. (Display will read 00.60)
9. Release [F] key and rotate dial until the display reads 30.63 [50].
10. Press [F] & [3] and change step back to 10.
11. Press [F] & [0].
12. Press [7]. (display should read ".")
13. Press [3] [0] [6] [3] transmit & receive expansion.
14. Press [*] (display should read 130.00)

--- IF YOU WANT TO CHANGE THE BAND LIMITS ---

15. Press [F] & [0]
16. Press [7]
17. Press [4] [8] [6] [9]
    (the first two digirs are the lower limit the last two are the upper limit)
18. Press [*]. (range is now 148-169.995)

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Receive and Transmit Expansion

ADI AT-48 / AT-400

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
430 - 463.995 MHz

Modification Instructions

1. Press and Hold [F] and turn power on. (display will read 440.00 or 433.00) (This will reset all memories!!)
2. Turn Power off
3. Press and hold [3] and turn power on. (display will read 440.00)
4. Press [F] & [3]. (Display will read 10)
5. Change step to 05 by turning dial one step.
6. Press [F] & [9]. (Display will read 05.00)
7. Press and hold [F] and turn dial until display reads 30.60 [50].
8. Release [F] key and rotate dial until the display reads 30.63 [50].
9. Press [F] & [3] and change step back to 10.
10. Press [F] & [0]. (display should read 440.00)
11. Press [7]. (display should read ".")
12. Press [3] [0] [6] [3] transmit & receive expansion
13. Press [*] (display should read 130.00)
14. Press [F] & [9] (display should read 30.63 [50])
15. Press and hold [F] and turn dial until display reads 05.63 [50].
16. Release [F] and turn dial until it reads 05.00.
17. Press [*]. (display should read 430.00)
18. Turn radio off and back on.

To change frequency coverage:

Press [F] & [0]
Press [7]. (display should read ".")
Press [0] [0] [7] [9] for 400 - 479.995 MHz coverage!!
Press [*]

Note : Use [F] and [MHz] key to change frequency stepping.

ADI AT-600 Receive and Transmit Expansion

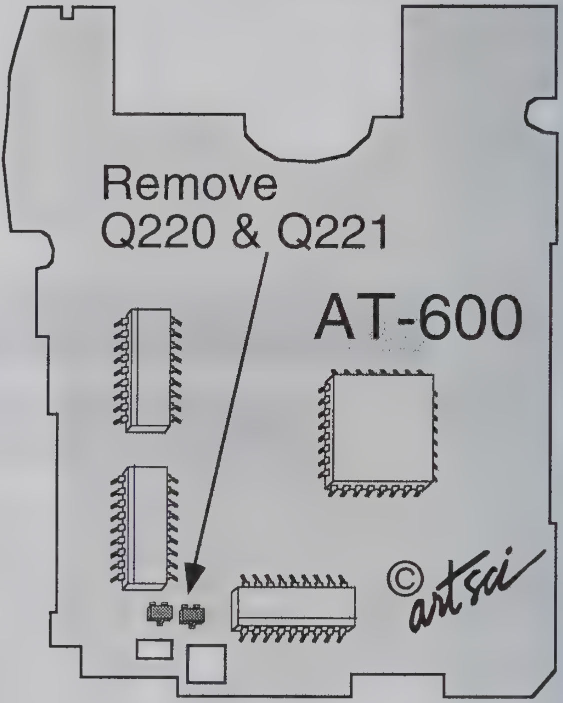
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

100 - 199.995 MHz
350 - 499.995 MHz
850 - 999.995 MHz Cellular blocked



There are several different versions of the AT-600 firmware. Early versions (firmware 1.10) require only keyboard modifications to expand. Later versions (firmware 1.2 and above) require hardware modification or a combination of both.

Modification Instructions

Keyboard modification

1. Press [F] & [0 SET/SB] and the same time.
2. Enter [1] [4] [5] [2] & [3].
3. Turn the radio off and back on.
4. Press [F] & [0 SET/SB] and the same time.
5. Enter [1] [4] [6] [2] [3] [1] [1] [2] [8] & [9].
6. THE VERSION # of your firmware should be displayed
7. Turn the radio off and back on.

Hardware modification

8. Remove power and antenna
9. Remove the screws and open the radio.
10. Locate and **remove Q220 and Q221**
11. Reassemble the radio
12. Press and hold [F} [LAMP] [5] and turn the radio on.

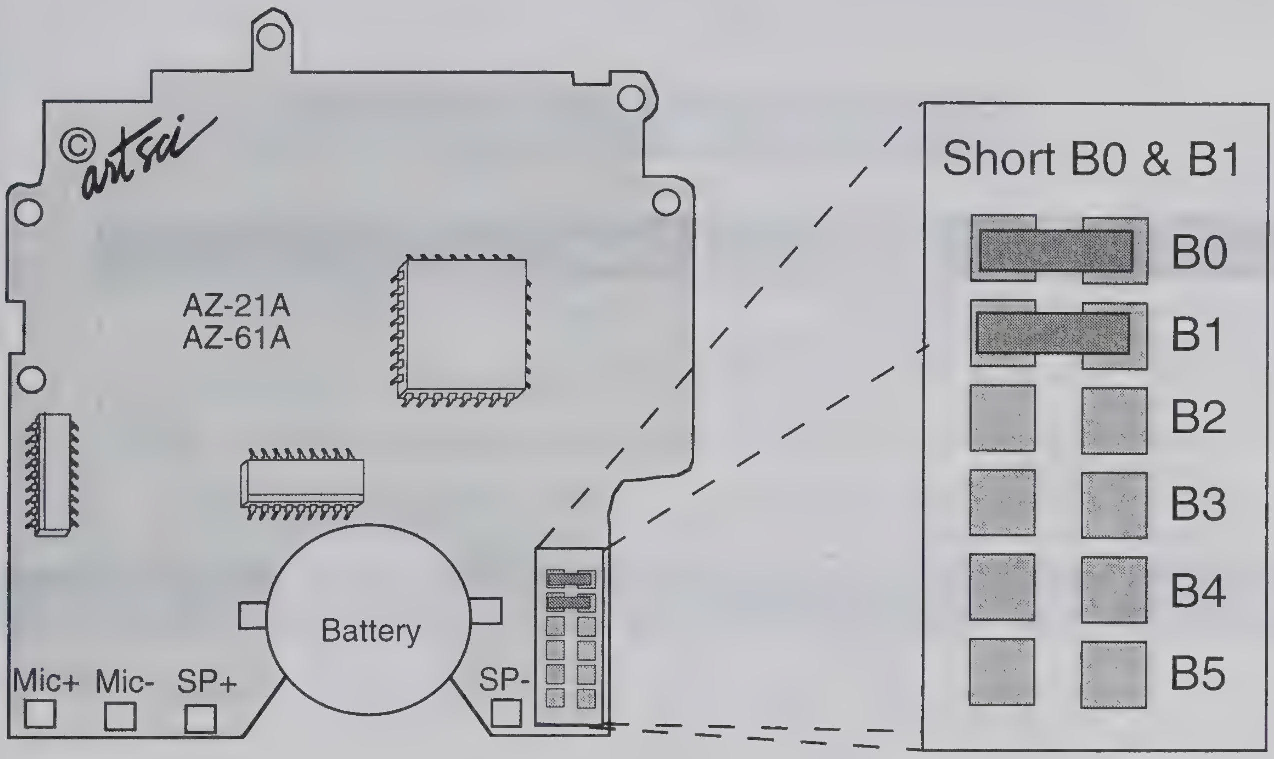
Receive and Transmit Expansion AZDEN AZ-21 / AZ-61

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
136 - 164 MHz TX/RX

USA versions (A)
can not be modified.



Modification Instructions

1. Remove Power and Antenna.
2. Remove Speaker & Squelch knobs
3. Remove battery rail screws
4. Remove three back cover screws.
5. Remove top cover and rubber gasket
6. Separate radio. (open like a book)
7. Remove three screws from the right hand board and move aside
8. Locate lower board and the solder pads B0 through B5
9. Locate and **solder bridge pads B0 & B1.**
10. Reassemble the radio.
11. **Reset the microprocessor**
    (Hold down the [CLR] key and turn the radio on)

AZDEN PSC-6000H
PSC-7000H
PSC-7500H

Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

138MHz - 160 Mhz. (6000 & 7000)
46.5 MHz - 54 MHz (7500)

Modification Instructions

1. Remove Power and Antenna.
2. Remove the Top and Bottom covers.
3. Locate and remove the four flat Phillips screws that secure the front panel to the chassis.
4. Locate and remove the four small Phillips screws securing the display PC Board to the chassis.
5. Locate and remove the one Phillips screw above the Microphone connector.
6. Carefully remove the PC board. CAUTION: Do not bend the PIN connectors.
7. **Locate and remove Diode D-207.** (Unsolder or Cut the diode away)
8. Reassemble the radio.

PCS-7xxx CPU RESET

1. Locate and remove four screws and remove the bottom cover.
2. Place the radio with the front of the radio away from you.
3. Locate the board behind the front panel and the 1/2 inch square outlined in WHITE in the upper left hand corner of the board. (the word "RESET" is marked inside the quare.
4. Locate the two 1/8" copper pads.
5. With the power on, short the two copper pads together. (A beep will sound)
6. Reassemble the radio.

Receive and Transmit Expansion KDK FM 240

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

140 - 156 MHz

Modification Instructions

1. Remove Power and Antenna.
2. Remove the cover.
3. **Press the RESET Button.**
4. Enter the new limits on the front panel switch.
5. Reassemble the radio.

Receive and Transmit Expansion KDK FM 2033

Expansion Range

Not all versions will get full expansion

138 - 165 MHz
420 - 469 MHz

Modification Instructions

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. **Connect diode D-21 (ECG-519) to Module INT-2033.**
4. Reassemble the radio.

Midland 73-030 Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
See Table Below

Modification Instructions

1. Turn the radio on.
2. Press [PAGE] key.
3. Press [UP] or [DOWN] arrow key to select the TX RX group.
4. The first digit "C" will flash, press the [UP] arrow key to select the desired group (see table below)
5. Turn the radio off
6. Press and hold the [UP] & [DOWN[arrow & turn the radio on.

Expansion Range

VHF	Transmit	Receive
C	144-146	144-146
1	144-148	144-148
2	144-148	136-174
3	136-174	136-174
4	100-175	100-175
5	138-175	138-175
6	145-175	145-175
P	140-160	140-160

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Radio Shack HTX-100

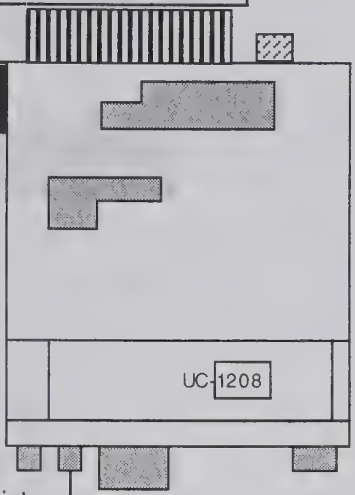
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

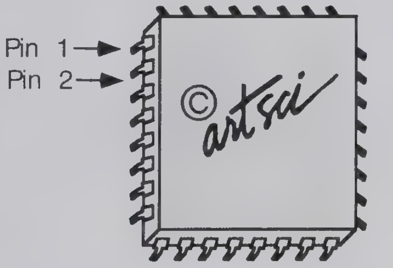
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

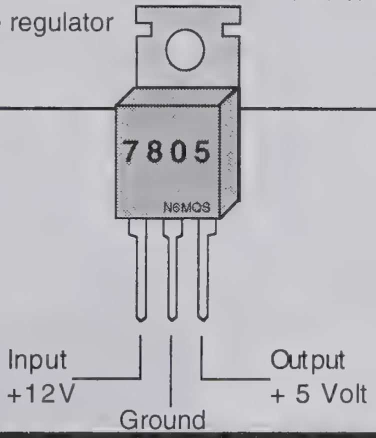
Expansion Range
Not all versions will get full expansion
26 - 29.99 MHz

Modification Instructions

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate synthesizer board on the bottom of the radio.
4. If your radio has microprocessor # UC-1208
   Unsolder and lift pins 28 & 29 of the microprocessor.
   You may wish to leave the pin soldered and etch the ground trace
   Go to instruction #6
5. If your radio's microprocessor is NOT a UC-1208
   Unsolder and lift pins 20 & 21 of the microprocessor.
   You may wish to leave the pin soldered and etch the ground trace
   Go to instruction #6
6. Connect the lifted pins together and jumper these pins to +5 volts with a 10K resistor
   +5 volts can be found on the 7805 voltage regulator
   or from the Cap. right next to pins 28 & 29.
7. Reassemble the radio.







Radio Shack HTX-245

Expansion Range
Not all versions will get full expansion
142.00 - 149.88 MHz
420.00 - 450.00 MHz

Modification Instructions

1) Press and hold [2] & [3] and turn the radio on
   (repeate to return the radio to normal mode)

Ranger AR-3300/3500 Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

Unknown

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Modification Instructions

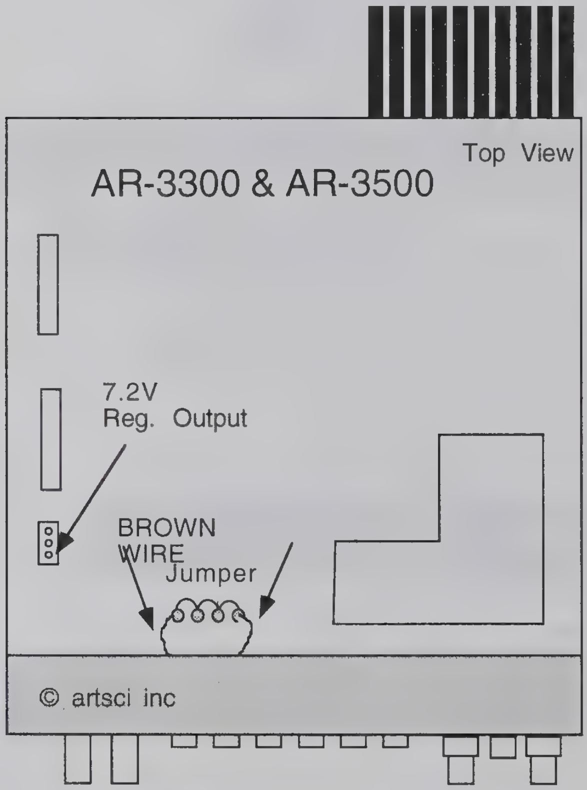
1. Turn radio on and enter the following:

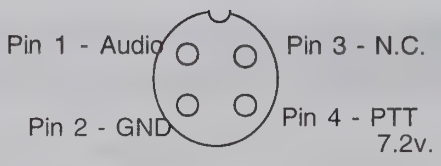
[ENTER] [1 CH] [ENTER] [MANUAL] [ENTER] [100 HZ DOWN]
[ENTER] [MEMORY] [MANUAL] [SCAN] [PROGRAM]
[100 HZ UP] [ENTER] [ENTER]
PUSH [1 MHZ UP] UNTIL 29.933.0 APPEARS
[ENTER] [SCAN DOWN] [ENTER] [2 CH] [ENTER]
[SCAN DOWN]
OPEN THE SQUELCH

The radio will now scan down in 10kHz steps. Store desired Frequencies into memory channels for later use.

OR

Solder jump the 3 pins located on the back side of the circuit board near the front center.





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Receive and Transmit Expansion

RCI 2950 / 2970

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

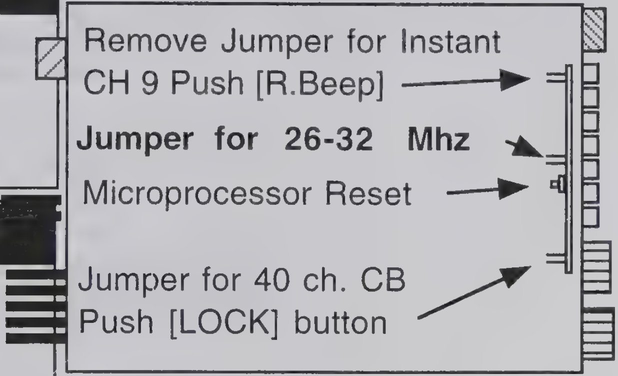
Clarifier Fine Tune (Tracks both TX & RX)
Expanded Range
CB "Style" operation
Instant Channel 9

Expansion Range
Not all versions will get full expansion
26 - 32 MHz

Modification Instructions

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate Jumper J1 & J2.
4. **Move Jumper from J1 and place it on Jumper J2**
5. Reassemble the radio.

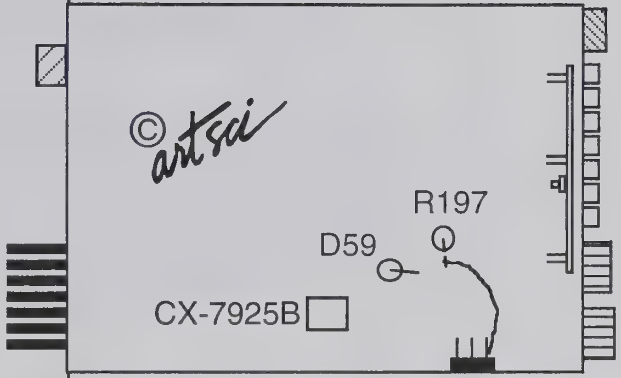
See below for new model information



Remove Jumper for Instant CH 9 Push [R.Beep]
Jumper for 26-32 Mhz
Microprocessor Reset
Jumper for 40 ch. CB Push [LOCK] button

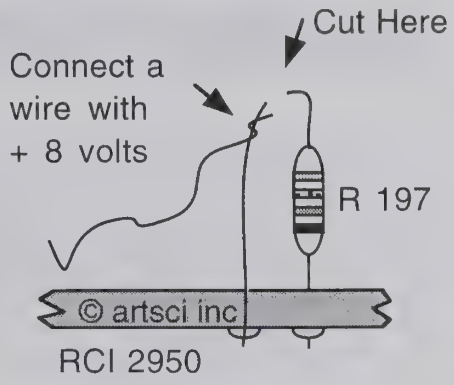
Alignment Procedure (not required)

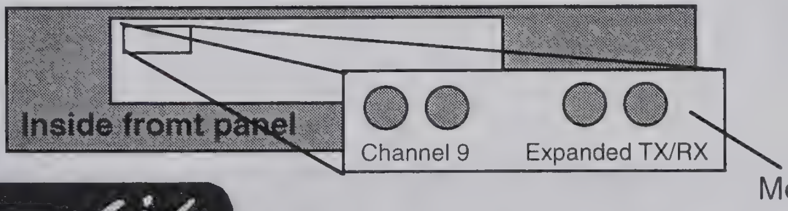
1. Set the frequency to 26.000 MHz (any mode)
2. Connect a DC voltmeter between J13 and ground.
   (The chassis is not grounded. You can find ground on the main circuit board)
   Adjust L17 to obtain a 1.0 V reading.
3. Set the service monitor to 10.240 MHz, SSB mode.
   Sniff at X2 and zero beat using VC2.
4. Remove the shorting bar located near the final amplifier transistors and key the radio.
   Sniff X2 and adjust VR21 to zero beat.
5. Repeat step 4 for receive at X1.
6. Set the service monitor to 10.695 MHz.
   Key the transmitter and sniff X3 in either AM or FM.
   Adjust L27 and zero beat.
7. Un-key the radio.
   Set the service monitor to 10.6925 MHz, USB mode.
   Key the transmitter and adjust L29 to zero beat.
   Un-key.
8. Un-key the radio.
   Set the service monitor to 10.6975 MHz, LSB mode.
   Key the transmitter and adjust L28 to zero beat.
   Un-key.
9. Replace shorting bar and set the radio to 28.0500 MHZ FM mode.
10. Inject an on-frequency FM signal into the radio and tune for best SINAD by adjusting L8, L9, L11, L12, L14, L4, L3, L5, L6 and L7.
    Repeat this step until SINAD reading of 12db or better with a .2 uV input.
11. Key the radio in UBS with a 1 KHz tone at 30 mV at the mic input.
    Adjust VR12 for maximum, approximately 30 W.
12. Adjust VC3, L34, L43, L46, L47, L48 and L19 for peak power out.
    Adjust VR12 to set max power to 25 watts.
13. Set mode to FM and key the radio.
    Set the output power to 10 watts using VR13.
14. Set the mode to AM and adjust VR14 for 90% modulation.



Fine Tune

1. **Remove Diode D59.**
2. **Cut lead on Resistor R197.**
   (see Drawing)
3. **Apply +8 volts from regulator to Resistor R 197.** (see Drawing)





Sender TR-145 — Receive and Transmit Expansion

Expansion Range

Not all versions will get full expansion

130 - 163.995 MHz

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Modification Instructions

1. Press and Hold [F] and turn power on. (display will read 145.00) (This will reset all memories!!)
2. Turn Power off
3. Press and hold [3] and turn power on. (display will read 145.00)
4. Press [F] & [3]. (Display will read 10)
5. Change step to 05 by turning dial one step.
6. Press [F] & [9]. (Display will read 00.60)
7. Press and hold [F] and turn dial until display reads 30.60 [50].
8. Release [F] key and rotate dial until the display reads 30.63 [50].
9. Press [F] & [3] and change step back to 10.
10. Press [F] & [0]. (display should read 145.00)
11. Press [7]. (display should read ".")
12. Press [3] [0] [6] [3] transmit & receive expansion
    or
    Press [3] [0] [7] [3] receive expansion only.
13. Press [*] (display should read 130.00)
14. Press [F] & [9] (display should read 30.63 [50])
15. Press and hold [F] and turn dial until display reads 00.63 [50].
16. Release [F] and turn dial until it reads 00.60.
17. Press [*]. (display should read 130.00)
18. Turn radio off and back on.

Sender TR-450

Expansion Range

Not all versions will get full expansion

400 - 469.995 MHz

Modification Instructions

1. Press [F] and turn power on, then off (RESET Radio)
2. Press [3] and turn power on. (400 - 469 MHz RX)
3. Press [F] &[0] then set CTCSS to 88.5 MHz (use rotary knob)
4. Press [F] & # then set page code to (memory 0 = C000)
5. Press [F] & [3] then set channel step to 5 KHz
6. Press [F] & [9] then keyin 6.1 MHz
7. Press [F[& [0] then [8]
8. Press the [*/ENT] key

Note: during testing, these steps needed to be performed multiple times

Receive and Transmit Expansion

TEN TEC PARAGON

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

1.7 - 30 MHz

Modification Instructions

1. Remove Power and Antenna.
2. Remove the Top cover.
3. **Locate and clip small jumper labeled "HAM".**
8. Reassemble the radio.

Dragon RPSY-201 Receive and Transmit Expansion

Expansion Range
Not all versions will get full expansion
25.165 to 29.699

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

10 Meter Amateur Hand Held Transceiver

Modification Instructions

1.) Remove battery pack from unit.
2.) Remove the (3) screws from the back of the radio.
3.) Remove the (1) screw from the front of the radio – this screw is located on the wrist strap holder.
4.) Lift off back panel of radio – be careful not to lose the battery pack latch and spring.
5.) Locate circuit board with PTT switch on it.
6.) Between PTT circuit board and main circuit board is a paper insulator.
7.) Gently bend back the paper insulator to expose the row of circuit board pads on the PTT circuit board.
8.) Some of the pairs of pads are marked S1 through S7 and each individual pad in the pair is marked either A or B.
9.) The pair of circuit board pads closest to the bottom of the radio is marked S1. The pair closest to the top of the radio is marked S7.
10.) The stock, or 10 meter band, settings for pads S1 through S7 are as follows:
- S1: Pads A and B are open (not soldered together).
- S2: Pads A and B are open (not soldered together).
- S3: Pads A and B are open (not soldered together).
- S4: Pads A and B are soldered together.
- S5: Pads A and B are soldered together.
- S6: Pads A and B are soldered together.
- S7: Pads A and B are soldered together.

11.) To expand the transmit and receive frequency you will need to solder on these small, surface mount circuit board pads. It is extremely important to use a small tip soldering iron on low heat setting so as to not damage the circuit board or pads! When clearing the pads of solder, use copper braid solder wick – do not use soldapullt (solder removal gun).
12.) To expand the transmit and receive frequency, reverse the settings of pads S1 through S7, or act as follows:
- S1: Pads A and B are soldered together.
- S2: Pads A and B are soldered together.
- S3: Pads A and B are soldered together.
- S4: Pads A and B are open (not soldered together).
- S5: Pads A and B are open (not soldered together).
- S6: Pads A and B are open (not soldered together).
- S7: Pads A and B are open (not soldered together).

13.) On the PTT circuit board, locate the single circuit board pad marked "RESET". This pad is the closest to the top of the radio.
14.) To reset the CPU board of the radio, use a piece of wire to temporarily short the "RESET" pad with circuit ground of the radio.
15.) Put the radio back together and put the battery pack back on.
16.) Turn the radio on. Note that the radio will still be on 10 meter amateur band. This is because you will be able to select either the 10 meter amateur band or the full expanded frequency range at any time.
17.) To select the full frequency range, press "FUNC" button and then press the "Call" button for more than (3) seconds.
18.) The display will now show channel and band. Press the "CALL" button to select different bands.
19.) In the expanded frequency mode, you can select either channel and band indicators, or frequency indicator. To toggle between display settings, press the "FUNC" button and then press the "CALL" button.
20.) To select 10 meter band operation only, press the "FUNC" button for more than (3) seconds. This will return the radio to the 10 meter band operation.

Receive and Transmit Expansion

Dragon RPSY-497

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
Unknown

Modification Instructions

1.) Remove the top cover.

2.) Locate the small circuit board mounted on the right hand side of the radio.

3.) Locate "CON1" and "CON2". Remove both small black jumper plugs. Move from pins 1 & 2 to pins 2 & 3.

4.) Locate the only jumper on the back side of the LCD display. If no jumper is present, add one or solder the two pins together.

Power and Modulation Adjustments

5.) RV-4 is the AM Power setting, adjust for maximum power output in AM.

6.) RV-5 is the AMC (Automatic Modulation Control), adjust for maximum modulation.

7.) RV-14 is the ALC (Automatic Limiting Control), adjust for maximum power in the sideband mode.

8.) Replace the bottom cover, making sure to reconnect the speaker to the main circuit board.

9.) Frequency, Power and Modulation modifications are complete.

Uniden HR-2510
HR-2600

Receive and Transmit Expansion

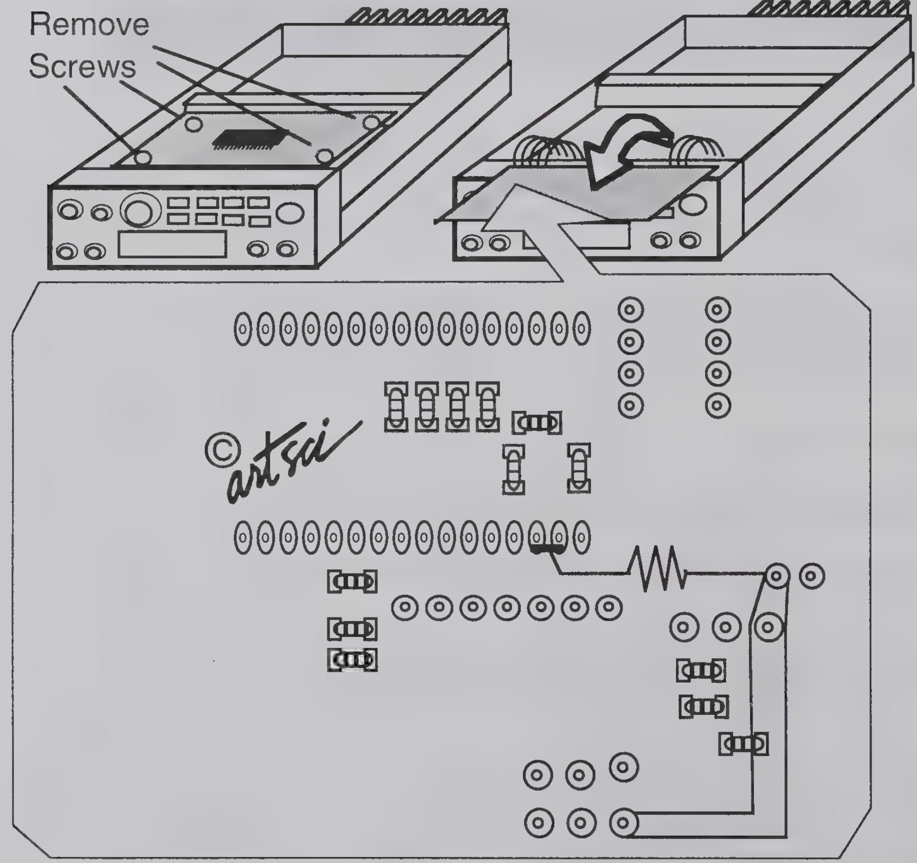
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

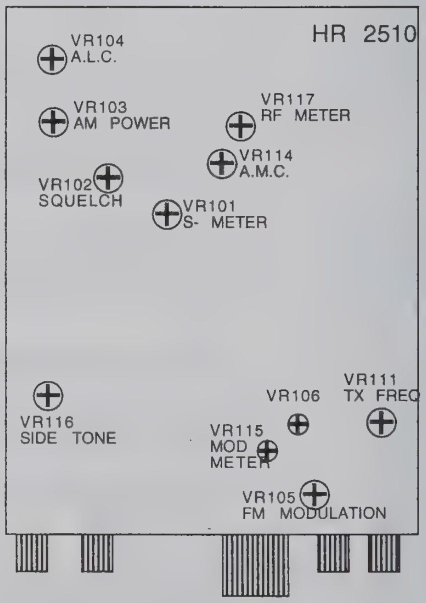
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
26 - 29.99 MHz

Expanded RF Modification

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate the Synthesizer board.
4. Pins 34 & 35 are grounded together on the underside of the synthesizer board. Cut the traces that connect these two pins to ground. (Cut all traces to these pins)
5. Solder one side of a 10K resistor to the connecting point of pins 34 & 35.
6. Connect the other leg of the 10 K resistor to + 5 volts. (where R181 & 187 are connected together.
7. Reassemble radio





You may need to replace the microprocessor. Replacement part # is **UC-1250.** (NOT 1251) It may be available from Uniden.You will lose the repeater offset.

Receive and Transmit Expansion

Uniden HR-2500

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

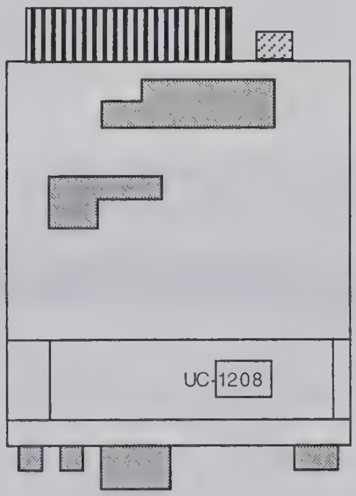
Expansion Range

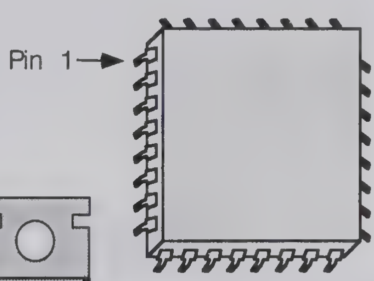
Not all versions will get full expansion

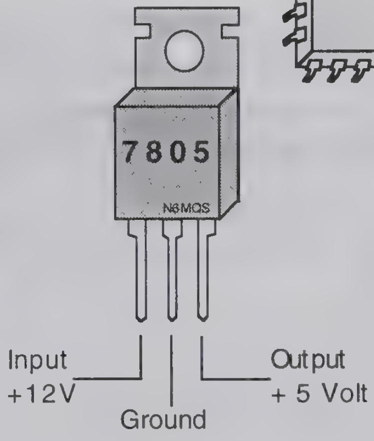
Unknown

Modification Instructions

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate synthesizer board on the bottom of the radio.
4. If your radio has microprocessor # UC-1208
   - Unsolder and lift pins 28 & 29 of the microprocessor.
     - You may wish to leave the pin soldered and etch the ground trace
     - Go to instruction #6
5. If your radio's microprocessor is NOT a UC-1208
   - Unsolder and lift pins 20 & 21 of the microprocessor.
     - You may wish to leave the pin soldered and etch the ground trace
     - Go to instruction #6
6. Connect the lifted pins together and jumper these pins to +5 volts with a 10K resistor
   - +5 volts can be found on the 7805 voltage regulator
     or
     from the Cap. right next to pins 28 & 29.
7. Reassemble the radio.







SGC GS-2020 Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

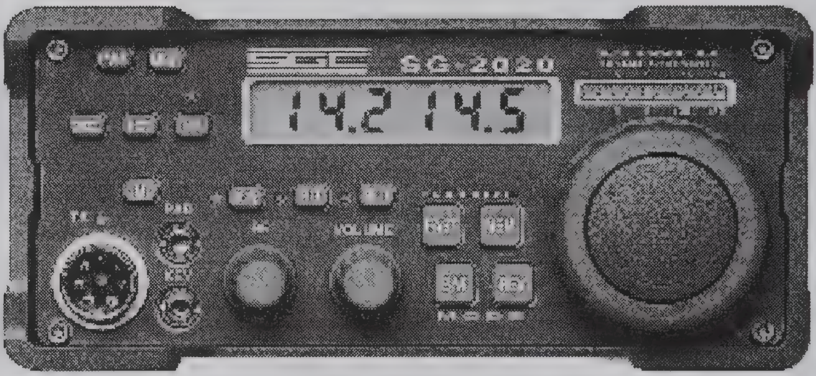
Expansion Range

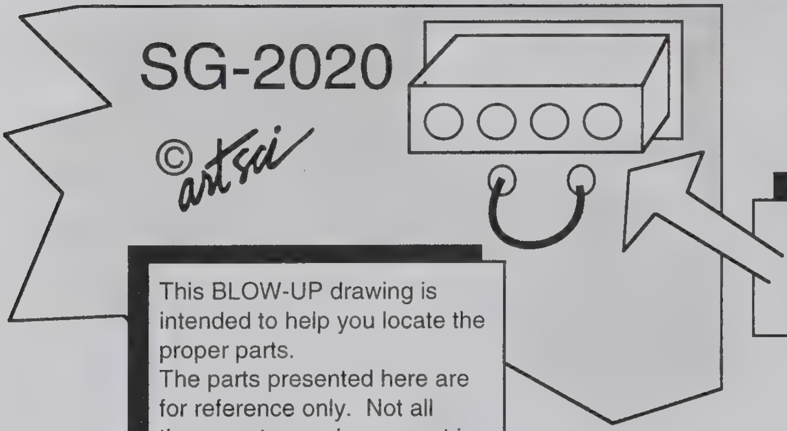
Not all versions will get full expansion

1.8 - 30 MHz

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.





This BLOW-UP drawing is intended to help you locate the proper parts.
The parts presented here are for reference only. Not all these parts may be present in your radio.

Remove 4-pin plug
Cut Jumper

Modification Instructions

1. Remove power and antenna.
2. Remove the 3 screws on the bottom of the radio and slide the case off.
3. Locate the 4-pin plug on the back of the front panel directly behind the main tuning knob.
4. Gently remove the plug from the socket to allow acess to the small wire jumper directly below.
5. **Locate and cut the jumper**
6. Replace the 4-pin plug above the jumper.
7. Slide the case back on.
8. Replace the 3 screws.

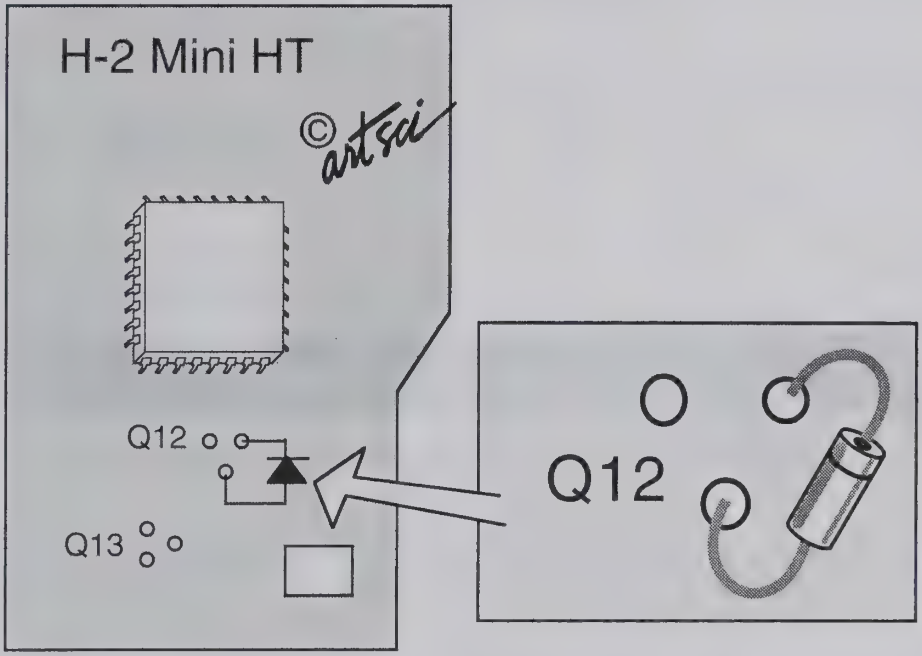
Receive and Transmit Expansion

Heath H-2 Mini HT

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
130 - 169.995 MHz



Modification Instructions

1. Remove battery and Antenna.
2. Remove 2 lower screws from the battery plate.
3. Remove 2 screws securing thr front & back cases.
4. Locate Q12 Position. (find point A and B)
5. **Solder a diode** (1N914 or eq.) from point A to point B
   Cathode to point A, Anode to Point B.
6. Reassemble the radio.
7. Reset the microprocessor.

Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

138 - 165 MHz
420 - 469 MHz

Modification Instructions

1. Remove battery and Antenna.
2. Remove 2 lower screws from the battery plate.
3. Remove 2 screws securing thr front & back cases.
4. Locate Q106 Position. (find point A and B)
5. **Solder a diode** (1N914 or eq.) from point A to point B
   Cathode to point A, Anode to Point B.
6. Reassemble the radio.

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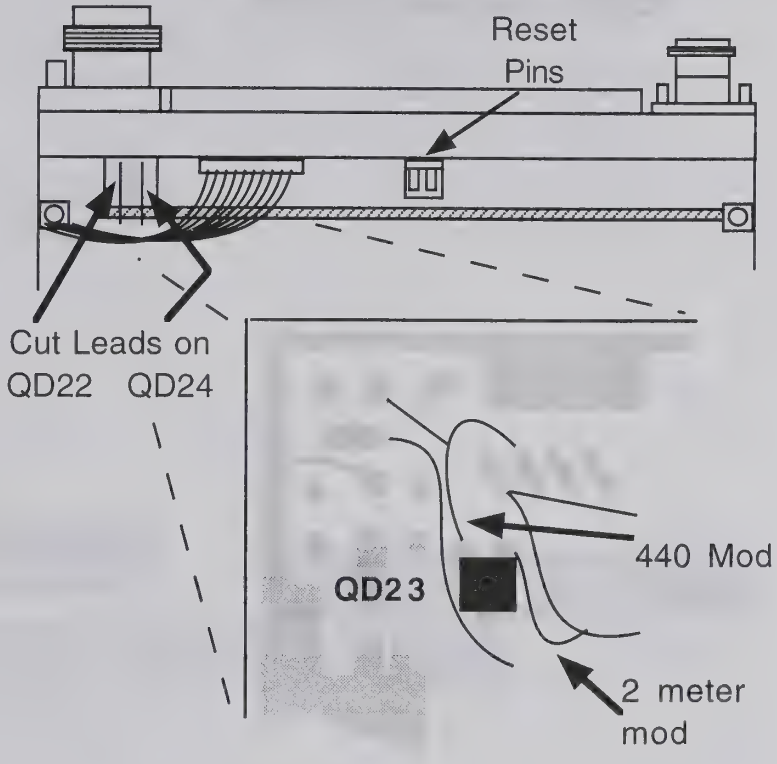
Receive and Transmit Expansion

Heath HW-24

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
Unknown



1. Turn Power on.
2. Push RESET.
3. Press and hold [FUNCTION] then [0]
4. Press and hold [FUNCTION] then [ENT]
5. Press PTT Briefly.
6. Press [UHF]
7. Press and hold [FUNCTION] then [LAMP]
8. Press and hold [FUNCTION] then [0]
9. Press and hold [FUNCTION] then [CODE]
10. Press and hold [FUNCTION] then [LAMP]
11. Press and hold [FUNCTION] then [3]
12. Press PTT Briefly.
13. Press [VHF]
14. Press and hold [FUNCTION] then [STEP]
15. Select 12.5 KHz. (Use Selectror Knob)
16. Press PTT Briefly.
17. Press and hold [FUNCTION] then [8]
18. Press and hold [FUNCTION] then [8]
19. Press and hold [FUNCTION] then [7]
20. Press and hold [FUNCTION] then [7]
21. Press and hold [FUNCTION] then [MS.M]
22. Select 144.9875 MHz (Use Selector Knob)
23. Press and hold [FUNCTION] then [0]
24. Press and hold [FUNCTION] then [ENT]
25. Press PTT Briefly.
26. Press and hold [FUNCTION] then [0]
27. Press and hold [FUNCTION] then [MS.M]

To Receive 300 - 400 Mhz or 800 - 900 MHz

Press [UHF]
Press and hold [FUNCTION] then [SET]
Press and hold [FUNCTION] then [3] to Select Bands

Expanded RF Modification

1. Remove power and Antenna.
2. Remove the wire mounting stand.
3. Remove the five screws that hold the bottom cover.
4. Remove the bottom plate being careful to unplug the speaker as you remove it.
5. Locate and cut the lead of QD22 (2 meter RX Mod)
6. Locate and cut the lead of QD24 (440 RX Mod)
7. Locate Chip Diode QD23 on front panel board.
8. **Cut leads to both bottom leads of QD23.**
   (note it may be required to remove the front panel from the body of the radio.)
9. Reassemble the radio (see next step)
10. Reset the Radio. (short the Reset pins with a wire or screw driver.)

Heath H24-HT

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

130 MHz - 169.995 MHz
340 Mhz - 379.995 MHz
400 MHz - 469.995 MHz.

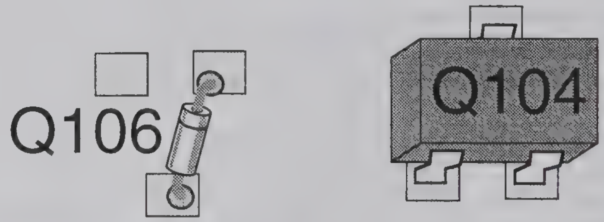
R240 - Deviation
R501 - CTCSS tone Deviation
R601 - DTMF tone deviation

Band Selection

Press [RCL]
Press [FUNC] then [C/BAND]

Hardware RF Modification

1. Remove Q104 from logic board.
   (Located to the left of the microprocesor.
2. Install a 1N4148 across Q106
   (below Q104 above)



Modification Instructions

Open Receiver
1. Set channel step to 12.5 kHz.
2. Select VFO A
3. Set Frequency to 147.7575 MHz.
4. Press [FUNC] then [7/RPT]
5. Press [FUNC] then [8+/-]
6. Press [FUNC] then [*ENT]
7. Press [FUNC] then [*ENT]

Open Transmitter
1. Set Frequency to 147.7575 MHz.
2. While in RPT mode, hold [VCS] and push [PTT].
3. Hold [FUNC] and press [REV].

Receive and Transmit Expansion

Heath SB-1400

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

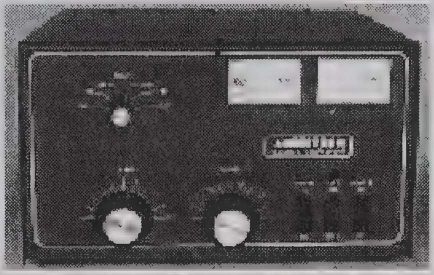
Expansion Range
Not all versions will get full expansion
Unknown

Modification Instructions

1. Remove power and Antenna.
2. Remoce screws and ope the case.
3. Locate the BROWN jumper wire on the display unit.
4. **Cut the BROWN jumper wire.**
5. Reassemble the radio.
6. Reset the microprocessor.
   (Set VFO at 12.3456 MHz, Turn power of and on again)

Ameritron AL-80B/572 Receive and Transmit Expansion

AL-80/A/B
AL-82
AL-572
AL-800/H
AL-811/H
AL-1200
AL-1500



Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

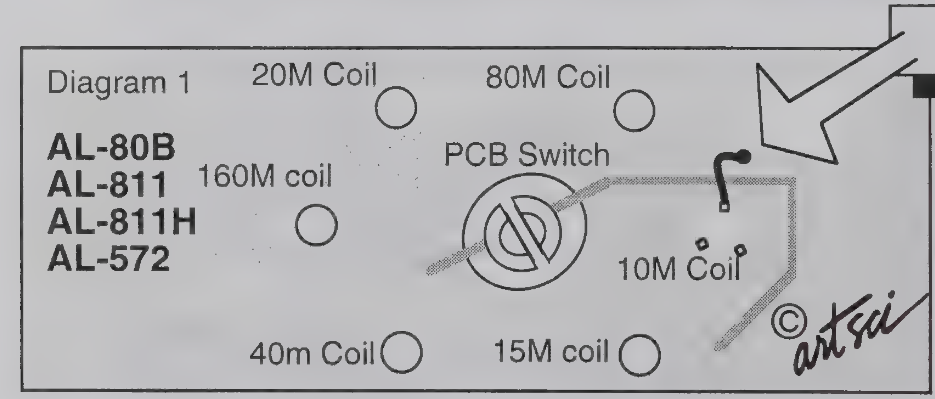
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

10 & 12 Meter operation

Modification Instructions

AL-80 (not A)	Needs a kit to be modified for 10/12 meters. Contact Ameritron.
AL-80A	Cut the green wire that exits the subchassis at the front panel end of the band switch. The wire connects ground to the plate tuning capacitor reduction drive.
AL-80B **AL-811** **AL-811H** **AL-572**	1. Remove the top cover. 2. Locate the rear panel P.C. Board 3. Locate the green wire that is connected from the P.C. board to one of the coils (see diagram 1) 4. Cut the Green wire 5. Replace the top cover 6. If high SWR occurs at the amp input, adjust the tune-input circuit with a 0.1 inch hex tuning tool. Adjust the slug for low swr when the amp is transmitting and tuned properly.
AL-82 **AL-1200** **AL-1500**	Cut the green wire at the front of the band switch
AL-800 **AL-800H**	1. Remove power and coax. 2. Place the amp with the back panel accessable 3. Locate and remove the 4 screws on the cover marked INPUT TUNING. 4. Locate and cut the green wire that is soldered to the PC board (Make sure the wire can not short against anything.) 5. Reassemble the amp.



This BLOW-UP drawing is intended to help you locate the proper parts.
The parts presented here are for reference only. Not all these parts may be present in your radio.

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Receive and Transmit Expansion Millennium 2002 & 3003

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
25.165 - 29.669 MHz

Modification Instructions

1. Turn radio on for approx 15 seconds
2. Turn off and remove power
3. Remove both cabinets
4. Remove fromt panel knobs.
5. Remove 6 screws holding front panel to radio.
6. Remove plastic front panel bezel.
7. Carefully separate the rest of the front panel assembly from the main body. (Be careful not to damage or stress the connecting wires)
8. Locate and **remove Diode D555** near the frequency control shaft (It will only be visible if the freq. control knob is removed.)
9. Reset the CPU. (Locate and momentarily short Pads SW414 & SW413 together)
10. Reassemble the radio.
11. Turn on the radio. It will default to the 10 meter band.

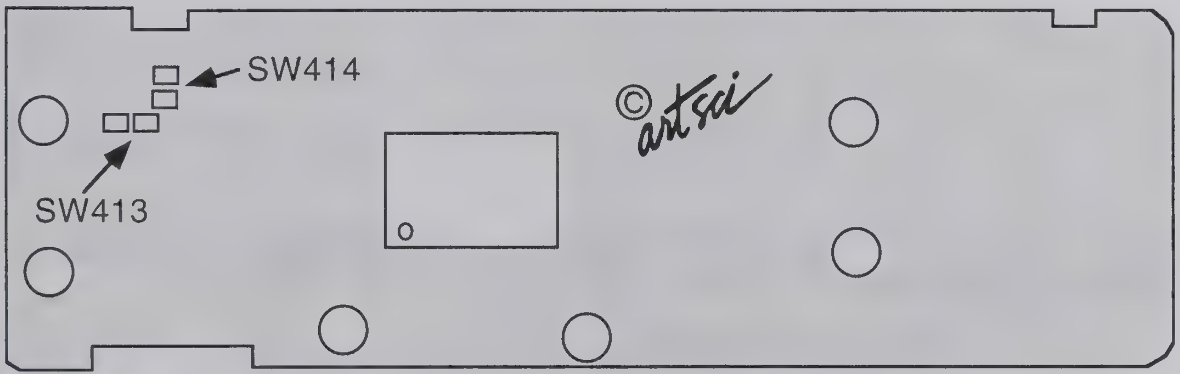
The Frequency control knob becomes a dual action control.
a) It can be pushed to control different functions such as display settings and band selection.

To access the expanded freq. range, press the [FUNC] button and the press in the Freq. control knob for approx. 3 seconds. The radio will now be set to the expanded Freq. range and the display knob will indicate channel and band.

To select Freq. display, press the [FUNC] button and press the freq. control knob.

To select different bands, press the frequency control knob.

To return to 10 meter band operation only, press the [FUNC] button and then push in the Freq. control knob for approx 3 seconds.

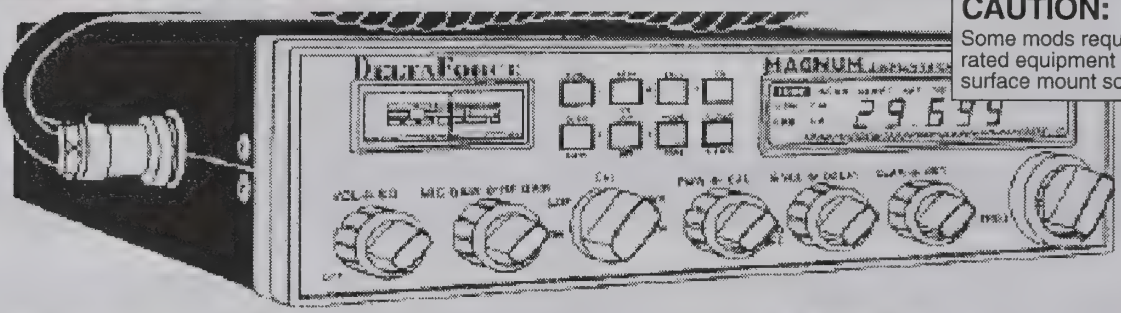


Magnum Delta Force
Magnum Alpha Force

Receive and Transmit Expansion

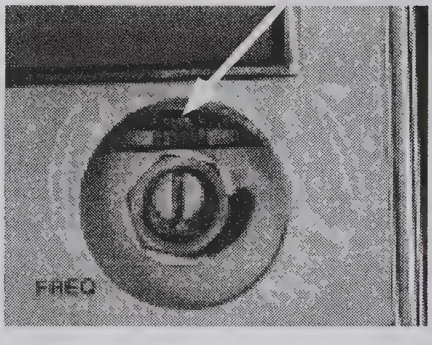
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

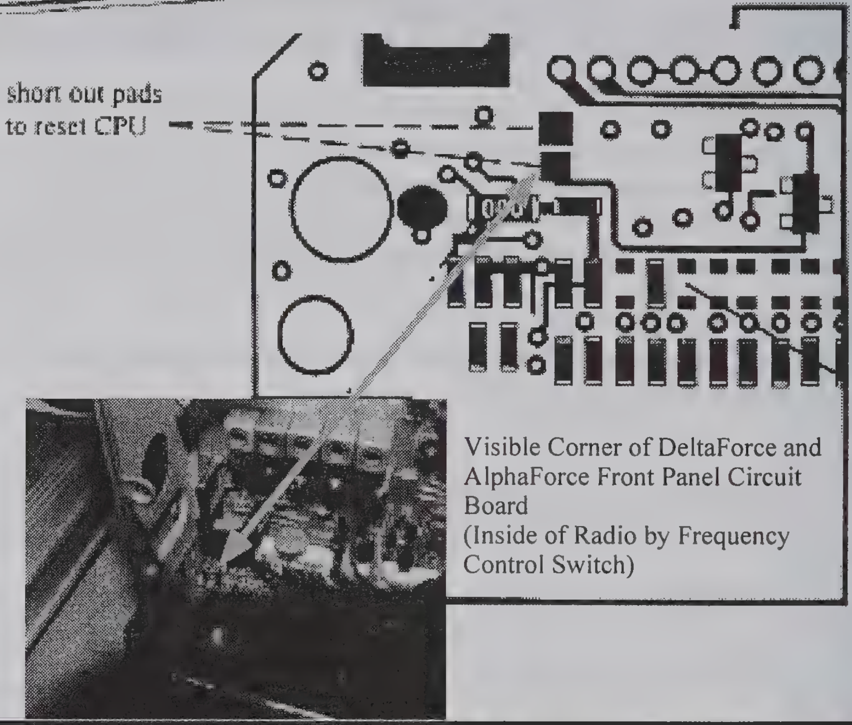
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Expansion Range
Not all versions will get full expansion
25.165 - 29.699 MHz

RemoveDiode
(removed in Picture)





Visible Corner of DeltaForce and AlphaForce Front Panel Circuit Board
(Inside of Radio by Frequency Control Switch)

Modification Instructions

1. Turn off radio and disconnect from all power sources.
2. Remove cabinets.
3. Remove frequency control knob on front panel.
4. Remove (unsolder or cut out) the diode on D555. This diode is located directly above the frequency control switch. It is the only visible component when the frequency control knob is removed. Note: THE D555 diode may be shielded with a piece of sleeving to prevent shorting.
5. Reset the radio CPU by temporarily touching the two front panel circuit board pads (see diagram above). An easy way to reset the CPU is by using an alligator clip lead. Clip one end of the alligator clip lead to a XTAL or VCO cage and momentarily touch the other end of the clip lead to the pads on the circuit board.
6. Hook the radio back up to power and turn on the radio.
7. Press the FUNC button, then press and hold the CALL button for approx. 3 seconds. The band indicator will appear on LCD. If the radio does not modify, double check your work and try resetting the CPU again (step 5).
8. Use the CALL button to select bands.
9. To switch between channel and frequency display, press the FUNC button and press the CALL button.
10. When turned off and on again, the radio will always default to original 10 meter settings. To automatically return to last used frequency and mode you can either:

1. Press the FUNC button and then press and hold the CALL button for approx. 3 seconds.
-or-
2. Press the LCR (last channel recall) button.

Receive and Transmit Expansion

Magnum SSB-10

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

25.165 to 29.699

CAUTION:

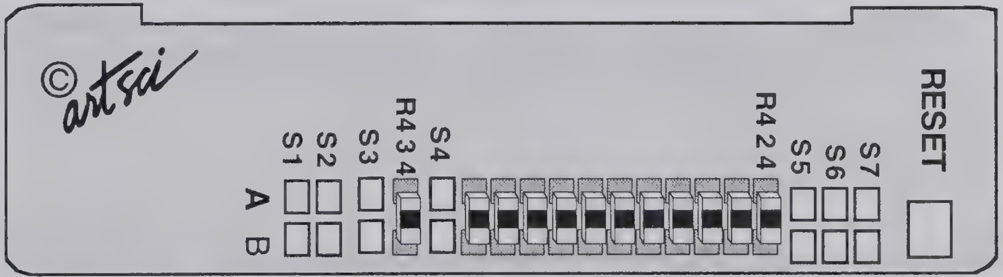
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Modification Instructions

1.) Remove battery pack from unit.
2.) Remove the (3) screws from the back of the radio.
3.) Remove the (1) screw from the front of the radio – this screw is located on the wrist strap holder.
4.) Lift off back panel of radio – be careful not to lose the battery pack latch and spring.
5.) Locate circuit board with PTT switch on it.
6.) Between PTT circuit board and main circuit board is a paper insulator.
7.) Gently bend back the paper insulator to expose the row of circuit board pads on the PTT circuit board.
8.) Some of the pairs of pads are marked S1 through S7 and each individual pad in the pair is marked either A or B.
9.) The pair of circuit board pads closest to the bottom of the radio is marked S1. The pair closest to the top of the radio is marked S7.
10.) The stock, or 10 meter band, settings for pads S1 through S7 are as follows:
- S1: Pads A and B are open (not soldered together).
- S2: Pads A and B are open (not soldered together).
- S3: Pads A and B are open (not soldered together).
- S4: Pads A and B are soldered together.
- S5: Pads A and B are soldered together.
- S6: Pads A and B are soldered together.
- S7: Pads A and B are soldered together.

11.) To expand the transmit and receive frequency you will need to solder on these small, surface mount circuit board pads. It is extremely important to use a small tip soldering iron on low heat setting so as to not damage the circuit board or pads! When clearing the pads of solder, use copper braid solder wick – do not use soldapullt (solder removal gun).
12.) To expand the transmit and receive frequency, reverse the settings of pads S1 through S7, or act as follows:
- S1: Pads A and B are soldered together.
- S2: Pads A and B are soldered together.
- S3: Pads A and B are soldered together.
- S4: Pads A and B are open (not soldered together).
- S5: Pads A and B are open (not soldered together).
- S6: Pads A and B are open (not soldered together).
- S7: Pads A and B are open (not soldered together).

13.) On the PTT circuit board, locate the single circuit board pad marked "RESET". This pad is the closest to the top of the radio.
14.) To reset the CPU board of the radio, use a piece of wire to temporarily short the "RESET" pad with circuit ground of the radio.
15.) Put the radio back together and put the battery pack back on.
16.) Turn the radio on. Note that the radio will still be on 10 meter amateur band. This is because you will be able to select either the 10 meter amateur band or the full expanded frequency range at any time.
17.) To select the full frequency range, press "FUNC" button and then press the "Call" button for more than (3) seconds.
18.) The display will now show channel and band. Press the "CALL" button to select different bands.
19.) In the expanded frequency mode, you can select either channel and band indicators, or frequency indicator. To toggle between display settings, press the "FUNC" button and then press the "CALL" button.
20.) To select 10 meter band operation only, press the "FUNC" button for more than (3) seconds. This will return the radio to the 10 meter band operation.



Expansion Range

Not all versions will get full expansion

136 - 174 MHz

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

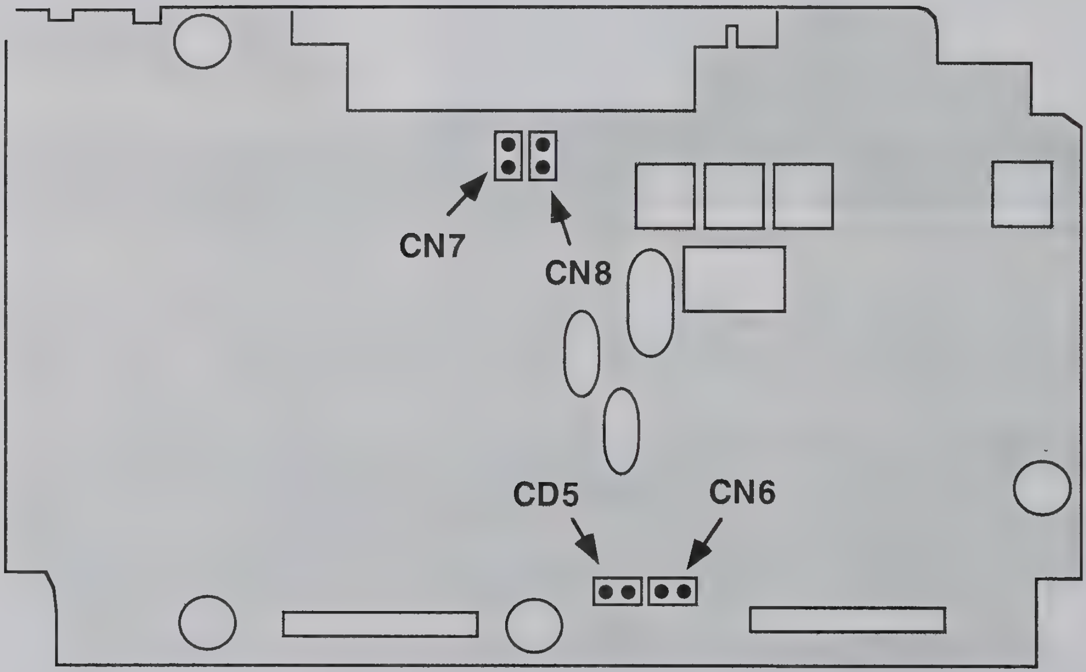
CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

2 Meter Mobile

Modification Instructions

1. Turn the radio off and remove power.
2. Remove the cabinet from the radio.
3. Locate the pin sets Labeled CN5 & CN6 on the main board.
4. **Remove the jumpers from CN5 & CN6.**
5. Place the jumpers on CN7 & CN8. (CN7 & CN8 are not active and are used to keep the jumpers in a safe place.
6. Reassemble the radio.
7. Press and hold [FUNC] button while turning on the radio.



Receive and Transmit Expansion Magnum 257,357DX, 457DX

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

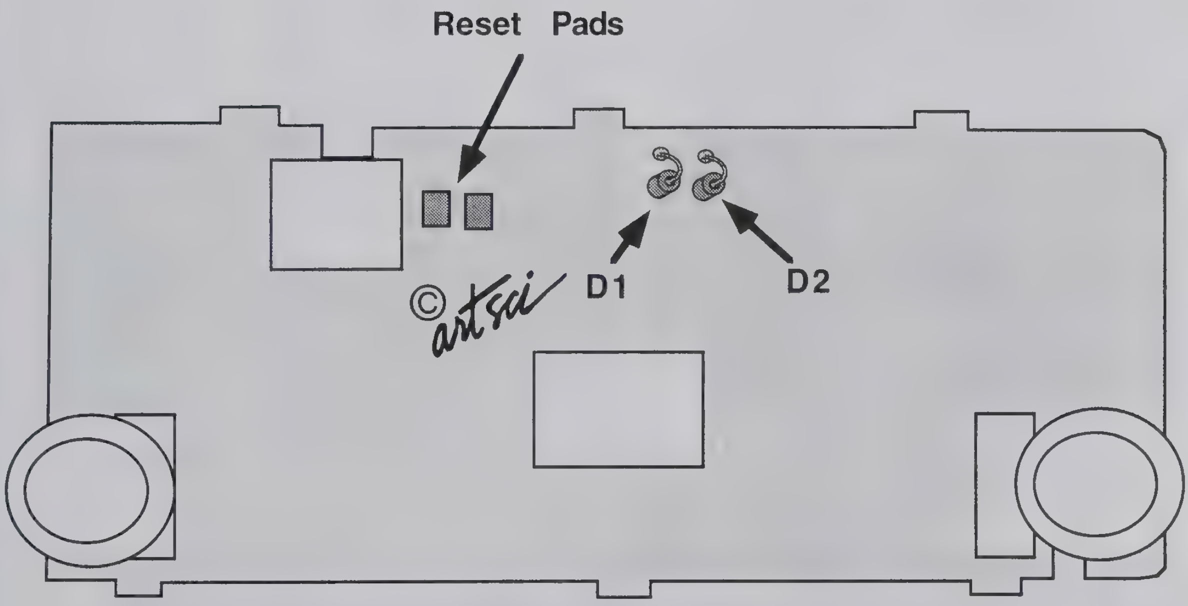
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
25.165 - 29.699 MHz

Modification Instructions

1. Turn radio off and remove power.
2. Remove bottom cabinet (speaker side)
3. Locate front panel circuit board
4. Locate and **cut Diode D2**.
5. **Reset the radio.**
   (Locate and temporarily short the two circuit pads next to the RF/MIC Gain control)
6. Reassemble the radio.
7. Turn the radio on.
8. Press [FUNC] and then press and hold [CALL] for more than 3 seconds.
   (Channel and band indicators will appear on the LCD.)

To toggle channel display and frequency display, press [FUNC] button and then press [CALL]
When channel and band are displayed, press [CALL] to select band.
To switch back to 10 meters band only, repeat step 8 above.



Magnum 502 Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

136 - 174 MHz

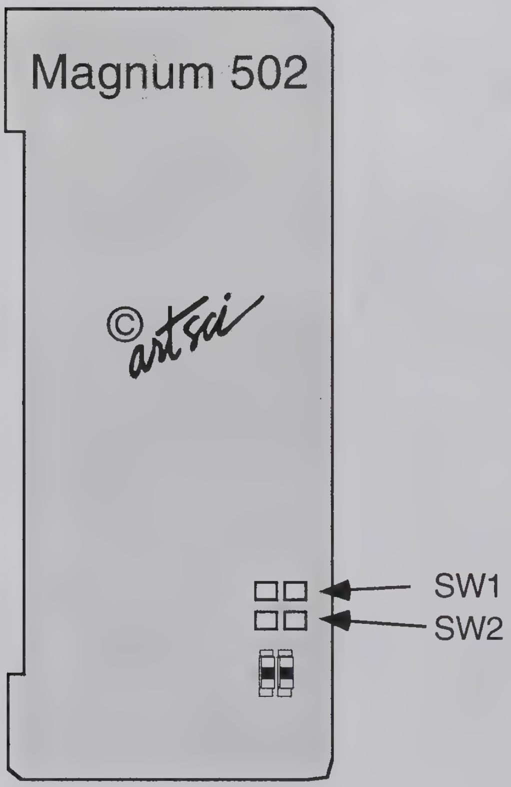
2 meter HT

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Modification Instructions

1. Remove battery pack.
2. Remove 3 screws from the back of the radio.
3. Remove the screw from the front of the radio (located on the wrist strap)
4. Lift off the back panel, (Be careful not to lose battery pack latch and spring)
5. Locate circuit board with the PTT switch on it.
6. Locate circuit pads labeled SW1 & SW2.
7. **Remove solder from both SW1 & SW2.**
8. Reasseble the radio.
9. Reset the CPU. (Hold [FUNC] and turn radio on and off)

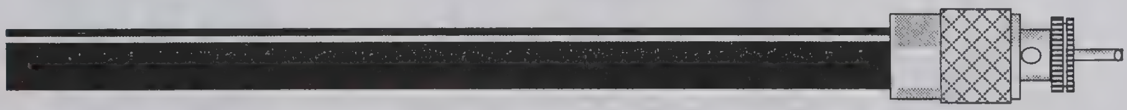


COBRA 148 GTL

148GTL	Expanded RF	CB - 2
Truth Table		CB - 2

CB Radios - Remove ALC Circuit - Higher TX Power

Cobra	Remove ALC control
Realistic	Remove ALC control
Alaron	Remove ALC control
Audiovox	Remove ALC control
Browning	Remove ALC control
Clarion	Remove ALC control
Colt	Remove ALC control
Convoy	Remove ALC control
Courier	Remove ALC control
Craig	Remove ALC control
Dak	Remove ALC control
Fannon	Remove ALC control
Fuzzbuster	Remove ALC control
GE	Remove ALC control
Gemtronics	Remove ALC control
Hy-gain	Remove ALC control
JC Penny	Remove ALC control
Johnson	Remove ALC control
Kraco	Remove ALC control
Layfayette	Remove ALC control
Midland	Remove ALC control
Mopar	Remove ALC control
Pace	Remove ALC control
Palomar	Remove ALC control
Panasonic	Remove ALC control
Pearce Sim	Remove ALC control
President	Remove ALC control
Raider	Remove ALC control
Ranger	Remove ALC control
RCA	Remove ALC control
RCI	Remove ALC control
Regency	Remove ALC control
Robyn	Remove ALC control.
Royce	Remove ALC control.
Sanyo	Remove ALC control.
SBE	Remove ALC control.
Sears	Remove ALC control.
Siltronics	Remove ALC control.
Sharp	Remove ALC control.
Superstar	Remove ALC control.
Teaberry	Remove ALC control.
Tenna Phase	Remove ALC control.
Tram	Remove ALC control.
Truetone	Remove ALC control.
Uniden	Remove ALC control.
VTAC	Remove ALC control.
Vector	Remove ALC control.
Wards	Remove ALC control.
Whistler	Remove ALC control.
Xtal	Remove ALC control.
Zexon	Remove ALC control.



COBRA 148 GTL

Any CB using MB8719 IC

Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

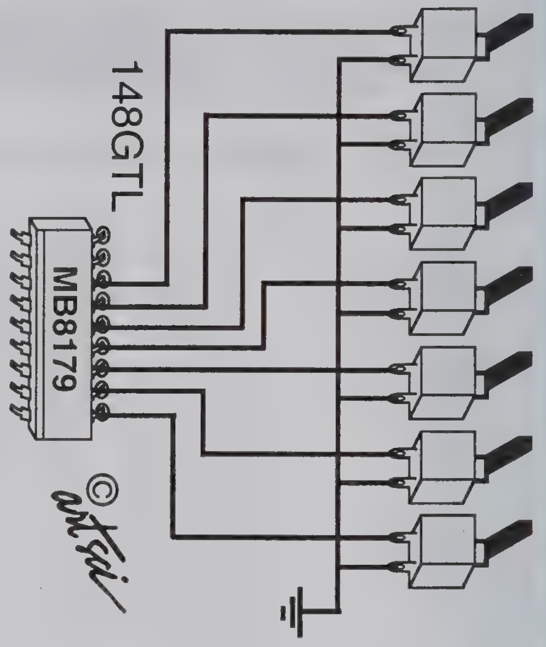
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Modification Instructions

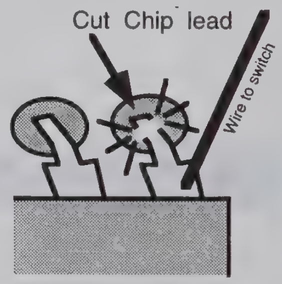
Note: This mod requires seven toggle switches to control Frequency. See frequency chart on the next page.

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate Synthesizer chip labeled MB8719
4. Cut wires connecting channel switch and pins 10-16.
5. Solder an on/off switch to each pin (pin 10-16)
6. reassemble radio.

Frequency		10	11	12	13	14	15	16
26.815	=	1	0	0	0	0	0	0
26.825	=	1	0	0	0	0	0	1
26.835	=	1	0	0	0	0	1	0
26.845	=	1	0	0	0	0	1	1
26.855	=	1	0	0	0	1	0	0
26.865	=	1	0	0	0	1	0	1
26.875	=	1	0	0	0	1	1	0
26.885	=	1	0	0	0	1	1	1
26.895	=	1	0	0	1	0	0	0
26.905	=	1	0	0	1	0	0	1
26.915	=	1	0	0	1	0	1	0
26.925	=	1	0	0	1	0	1	1
26.935	=	1	0	0	1	1	0	0
26.945	=	1	0	0	1	1	0	1
26.955	=	1	0	0	1	1	1	0
26.965	=	1	0	0	1	1	1	1
26.975	=	1	0	1	0	0	0	0
26.985	=	1	0	1	0	0	0	1
26.995	=	1	0	1	0	0	1	0
27.005	=	1	0	1	0	0	1	1
27.015	=	1	0	1	0	1	0	0
27.025	=	1	0	1	0	1	0	1
27.035	=	1	0	1	0	1	1	0
27.045	=	1	0	1	0	1	1	1
27.055	=	1	0	1	1	0	0	0
27.065	=	1	0	1	1	0	0	1
27.075	=	1	0	1	1	0	1	0
27.085	=	1	0	1	1	0	1	1
27.095	=	1	0	1	1	1	0	0
27.105	=	1	0	1	1	1	0	1
27.115	=	1	0	1	1	1	1	0
27.125	=	1	0	1	1	1	1	1
27.135	=	1	1	0	0	0	0	0
27.145	=	1	1	0	0	0	0	1
27.155	=	1	1	0	0	0	1	0
27.165	=	1	1	0	0	0	1	1
27.175	=	1	1	0	0	1	0	0
27.185	=	1	1	0	0	1	0	1
27.195	=	1	1	0	0	1	1	0
27.205	=	1	1	0	0	1	1	1
27.215	=	1	1	0	1	0	0	0
27.225	=	1	1	0	1	0	0	1
27.235	=	1	1	0	1	0	1	0
27.245	=	1	1	0	1	0	1	1
27.255	=	1	1	0	1	1	0	0
27.265	=	1	1	0	1	1	0	1
27.275	=	1	1	0	1	1	1	0
27.285	=	1	1	0	1	1	1	1
27.295	=	1	1	1	0	0	0	0
27.305	=	1	1	1	0	0	0	1
27.315	=	1	1	1	0	0	1	0
27.325	=	1	1	1	0	0	1	1
27.335	=	1	1	1	0	1	0	0
27.345	=	1	1	1	0	1	0	1
27.355	=	1	1	1	0	1	1	0
27.365	=	1	1	1	0	1	1	1
27.375	=	1	1	1	1	0	0	0
27.385	=	1	1	1	1	0	0	1
27.395	=	1	1	1	1	0	1	0
27.405	=	1	1	1	1	0	1	1
27.415	=	1	1	1	1	1	0	0
27.425	=	1	1	1	1	1	0	1
27.435	=	1	1	1	1	1	1	0
27.445	=	1	1	1	1	1	1	1
27.455	=	0	0	0	0	0	0	0
27.465	=	0	0	0	0	0	0	1
27.475	=	0	0	0	0	0	1	0
27.485	=	0	0	0	0	0	1	1
27.495	=	0	0	0	0	1	0	0
27.505	=	0	0	0	0	1	0	1
27.515	=	0	0	0	0	1	1	0
27.525	=	0	0	0	0	1	1	1
27.535	=	0	0	0	1	0	0	0
27.545	=	0	0	0	1	0	0	1
27.555	=	0	0	0	1	0	1	0
27.565	=	0	0	0	1	0	1	1
27.575	=	0	0	0	1	1	0	0
27.585	=	0	0	0	1	1	0	1
27.595	=	0	0	0	1	1	1	0
27.605	=	0	0	0	1	1	1	1
27.615	=	0	0	1	0	0	0	0
27.625	=	0	0	1	0	0	0	1
27.635	=	0	0	1	0	0	1	0
27.645	=	0	0	1	0	0	1	1
27.655	=	0	0	1	0	1	0	0
27.665	=	0	0	1	0	1	0	1
27.675	=	0	0	1	0	1	1	0
27.685	=	0	0	1	0	1	1	1
27.695	=	0	0	1	1	0	0	0
27.705	=	0	0	1	1	0	0	1
27.715	=	0	0	1	1	0	1	0
27.725	=	0	0	1	1	0	1	1
27.735	=	0	0	1	1	1	0	0
27.745	=	0	0	1	1	1	0	1
27.755	=	0	0	1	1	1	1	0
27.765	=	0	0	1	1	1	1	1
27.775	=	0	1	0	0	0	0	0
27.785	=	0	1	0	0	0	0	1
27.795	=	0	1	0	0	0	1	0
27.805	=	0	1	0	0	0	1	1
27.815	=	0	1	0	0	1	0	0
27.825	=	0	1	0	0	1	0	1
27.835	=	0	1	0	0	1	1	0
27.845	=	0	1	0	0	1	1	1
27.855	=	0	1	0	1	0	0	0
27.865	=	0	1	0	1	0	0	1
27.875	=	0	1	0	1	0	1	0
27.885	=	0	1	0	1	0	1	1
27.895	=	0	1	0	1	1	0	0
27.905	=	0	1	0	1	1	0	1
27.915	=	0	1	0	1	1	1	0
27.925	=	0	1	0	1	1	1	1
27.935	=	0	1	1	0	0	0	0
27.945	=	0	1	1	0	0	0	1
27.955	=	0	1	1	0	0	1	0
27.965	=	0	1	1	0	0	1	1
27.975	=	0	1	1	0	1	0	0
27.985	=	0	1	1	0	1	0	1
27.995	=	0	1	1	0	1	1	0
28.005	=	0	1	1	0	1	1	1
28.015	=	0	1	1	1	0	0	0
28.025	=	0	1	1	1	0	0	1
28.035	=	0	1	1	1	0	1	0
28.045	=	0	1	1	1	0	1	1
28.055	=	0	1	1	1	1	0	0
28.065	=	0	1	1	1	1	0	1
28.075	=	0	1	1	1	1	1	0
28.085	=	0	1	1	1	1	1	1



These seven switches take the place of the rotary channel knob.
See switch setting chart on the next page



Remove ALC Circuit

COBRA CB's

REMOVE ALC CIRCUIT (Higher TX power)

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate the indicated part and remove it.
4. Reassemble radio.

MODEL	REMOVE THIS PART
18-LTD	R-87
19 PLUS	D-502
20 PLUS	VR-502
21 PLUS	D-20
21 GTL	TR-14
21 LTD	TR-14 OR D9
21 XLR	TR-20
25 GTL	TR-14
25 PLUS	D-20
27	X8
29 GTL	D-20
29 PLUS	R-79 OR D-20
31 PLUS	D-19
32 XLR	TR-18
33 PLUS	D-17
40 PLUS	VR-104
78 X	C-49
85	D-9
86 XLR	CD-9
87 GTL	VR-6
89 GTL	VR-6
89 XLR	VR-5
132 XLR	R-134 = AM R-130 = SSB'
135 XLR	R-134 = AM R-130 = SSB'
138 XLR	TR-23
139 XLR	R-132
140 GTL	TR-32
142 GTL	TR-32
148 DX	VR-14=AM & VR-12=SSB
148 GTL	TR-24
150 GTL	RV-14=AM & RV-4=SSB
1000 GTL	VR-6
2000 GTL	TR-24 & C-232
REMOTE CONTROL	D-401

REALISTIC CB's

REMOVE ALC CIRCUIT (Higher TX power)

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate the indicated part and remove it.
4. Reassemble radio.

MODEL	REMOVE THIS PART
TRC-417	Q-19
TRC-421	D-16
TRC-422	Q-11
TRC-432	Q-12
TRC-440	D-107
TRC-448	VR-5=AM & VR-204=SSB
TRC-449	VR-7=AM & CT-7=SSB
TRC-452	VR-207
TRC-454	VR-702
TRC-455	R-504
TRC-457	VR-7=AM & CT-7=SSB
TRC-461	VR-2
TRC-462	D-17
TRC-467	D-109
TRC-468	R-42
TRC-469	VR-5
TRC-473	D-17
TRC-410	Q-12
TRC-413	R-85
TRC-415	Q-7
TRC-427	C-78
TRC-428	R-90
TRC-433	Q-15
TRC-451	VR-5=AM & VR-6=SSB
TRC-453	R-146
21-1537	D-17

OTHER CB's

REMOVE ALC CIRCUIT (Higher TX power)

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate the indicated part and remove it.
4. Reassemble the radio.

COMPANY	MODEL	REMOVE THIS PART
ALARON	B4900 Q-201	
AUDIOVOX	WINSOR	D-12
100	D-12	
CB-930	RV-2	
CB-950	D-39	
CBH-990	RV-2	
CBR-9600	RV-105	
BROWNING	BARON	R-134=AM & R-130=SSB
BROWNIE	Q-13	
MARK III	R-38=AM & R-69=SSB	
SABRE	CD-11	
SST-2	CD-11	
CLARICON	PRIVATEER	CR-107
COLT	190 R-71	
222	C-228	
290	RV-2	
320 DX	RV-14=AM & RV-4=SSB	
320 FM	RV-14=AM & RV-4=SSB	
350	R-121	
390	RV-2	
480	RV-12=AM & RV-11=SSB	
485	RV-12=AM & RV-11=SSB	
800	RV-2	
1000	RV-12=AM & RV-11=SSB	
1200 DX	RV-14=AM & RV-4=SSB	
CONVOY	CON-400	R-129
COURIER	BLAZER 40D	VR-9
CARAVELLE 40D	R-504	
CENTURIAN 40	D-24	
CENTURION 40D	D-46	
CHIEF 23	X-8	
CONQUEROR	R-504	
GLADIATOR	D-46	
NIGHT RIDER 40	VR-301	
RANGLER 40	VR-301	
RENEGADE 40	VR-9	

MODEL	REMOVE THIS PART	
ROGUE 40	VR-5	
CRAIG	L101 R-226	
L-321	R-605=AM & R-20=SSB	
DAK	IX Q-202	
X	Q-37 & Q-38	
FANNON	12SF R-76	
190 DF	VR-301	
182F	D-12	
184DF	D-12	
185DF	VR-301	
185PLL	VR-301	
SFT 400	D-10	
FUZZBUSTER	2-50 Q-8	
GE	3-5801A	VR-7
3-5804A	VR-7	
3-5804D	RV-2	
3-5810B	RV-2	
3-5811B	RV-2	
3-5812A	RV-2	
3-5813A	RV-2	
3-5813B	RV-2	
3-5814A	C-98	
3-5814B	RV-2	
3-5818A	RV-2	
3-5819A	RV-2	
3-5821A	VR-10	
3-5821B	VR-10	
3-5869A	RV-2	
3-5871A	VR-11	
3-5871B	VR-11	
3-5875A	RV-9=AM & VR-201=SSB	
GEMTRONICS	GTX-44	RV-2
GTX-55	RV-2	
GTX-66	RV-2	
GTX-77	RV-2	
3000-GTX	R-93	
4040	D-481	
5000-GTX	VR-4	
HY-GAIN	672 B RV-2	
674 B	VR-7	
2679 I	RV-2	
2680 II	RV-2	
2681 II	RV-2	
2682 II	RV-2	
2683 III	RV-2	

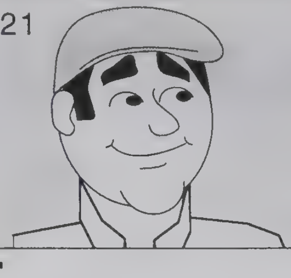
MODEL	REMOVE THIS PART	
2701 I	RV-2	
2702 II	RV-2	
2703 III	RV-2	
2795	RV-14=AM & RV-4=SSB	
2795 DX	RV-14=AM & RV-4=SSB	
V SSB	VR-7	
JC PENNY	981-6221	D-501
981-6237	D-7	
81-6241	Q-405	
218	RV-2	
JOHNSON	4120	CR-12
4125	CR-12	
4135	CR-12	
4140	R-37	
4145	R-37	
4230	R-37	
KRACO	KCB-4000	VR-4
KCB-4010	RV-2	
KCB-4020	RV-2	
KCB-4030	RV-2	
KCB-4045	RV-2	
LAFAYETTE	HB-650	RV-102
HB-750	RV-102	
HB-870	RV-14=AM & RV-4=SSB	
HB-940	RV-2	
SSB-100	RV-7=AM & RV-8=SSB	
SSB-140	RV-12=AM & RV-11=SSB	
TELSTAT 1140	RV-2	
TELSTAT 1240	VR-305	
MIDLAND	76-858	RV-2
76-860	R-218	
76-863	RV-2	
77-101B	RV-201	
77-101C	RV-201	
77-116	RV-2	
77-821	RV-2	
77-824	RV-201	
77-825	D-3	
77-830	RV-2	
77-838	RV-2	
77-849	RV-2	
77-856	VR-5	
77-857	RV-2	
77-861	D-2	
77-866	TR-8	
77-867	D-14	
77-874	X-11	

MODEL	REMOVE THIS PART	
77-882	Q-15	
77-883	X-11	
77-888	RV-2	
77-889	RV-2	
77-963	RV-2	
79-892	RV-12=AM & RV-11=SSB	
79-893	RT-601=AM & RV-7=SSB	
MOPAR	4094177	RV-2
4094178	RV-2	
PACE	CB-145	CV-20
CB-166	R-207	
1000-MS	CR-508	
2300	X-9	
CB-8008	R-218	
CB-8010	R-220	
CB-8015	R-220	
CB-8041	R-302	
CB-8046	R-302	
CB-8117	R-220	
CB-8117	R-220	
PALOMAR	49	R-208
SSB-500	RV-12=AM & RV-2=SSB	
4100	RV-2	
PANASONIC	RJ-3150	R-117
RJ-3250	R-70	
PEARCE	JAGUAR	FVR-3
SIMPSON	LION	RV-2
SUPER LYNX	D-12	
TIGER	RV-2	
PRESIDENT		
ADAMS (OLD)	VR-7=AM & CT-7=SSB	
ADAMS (NEW)	TR-24	
AR-7	R-54	
AX-43	Q-12	
DWIGHT D	VR-6	
GRANT (OLD)	VR-7=AM & CT-7=SSB	
GRANT (NEW)	R-128=AM & VR-11=SSB	
HONEST ABE	VR-5	
JOHN Q	RT-4	
MADISON (OLD)	VR-7=AB & CT-7=SSB	
MADISON (NEW)	R-128	
MCKINLEY	R-120	
OLD HICKORY	VR-5	
TEDDY R	VR-5	
THOMAS J	VR-4	
WASHINGTON (OLD)	VR-7=AM & CT-7=SSB	

MODEL	REMOVE THIS PART
WASHINGTON (NEW)	TR-32
ZACHARY T	VR-6
RAIDER	404-R D-52
RANGER	AR-3300 VR-17=AM & VR-15=SSB
AR-3500	VR-17=AM & VR-15=SSB
RCA	14T260 RV-2
14T270	RV-2
14T301	RV-2
14T302	D-301
14T303	RV-2
14T304	RV-2
14T305	RV-2
RCI	2900 VR-14=AM & VR-12=SSB
2950	VR-14=AM & VR-12=SSB
REGENCY	CR-186 D-9
ROBYN	AM-500D VR-5
DG-130D	VR-6
GT-410	VR-13
LB-120	VR-6
SX-401	RV-7
SX-402D	VR-13
T240D	VR-4
WV-110	VR-6
007-140	VR-6
123-C	D-11
510-D	VR-7=AM & CT-7=SSB
ROYCE	1-602 D-6
1-603	Q-205
1-606	D-17
1-607	VR-201
1-609	Q-205
1-610	D-202
1-619	D-301
1-620	D-301
1-621	VR-3
1-625	VR-1602
1-630	C-79 & D-42 & D-44
1-639	Q-16
1-641	VR-7
1-648	C-82 & C-35 & C-96
1-653D	D-301
1-655	D-301
1-658	D-301
1-662	D-301
1-673	D-301

MODEL	REMOVE THIS PART
1-675	D-301
1-680	D-301
1-682	D-301
SBE	ASPEN-41 VR-203
CONSOLE II	VR-7=AM & VR-1=SSB
CONSOLE V	VR-803=AM & VR-302=SSB
CORTEX	VR-203
FORMULA D	VR-9
KEYCOM 54	RV-1
LCB-8	VR-6
LCMS-5	VR-6
MALIBU 44	R-226
TAHOE 49	R-129
TOUCH COM 174	VR-4
TRINIDAD 45	R-226
SEARS	370.380507 R-218
934.36710501	D-6
934.380607	D-7
934.380627	R-42
934.380807	D-7
934.380817	D-501
934.381107	D-501
934.381207	D-502
SILTRONICS	APACHE D-14
MOHAWK	D-14
SHARP	CB-750 R-112
CB-2260	R-112
SUPERSTAR	120 D-11
360 FM	VR-14=AM & VR-12=SSB
3600	VR-14=AM & VR-12=SSB
TEABERRY	RACER T VR-6
STALKER I	VR-13=AM & VR-12=SSB
STALKER II	VR-13=AM & VR-12=SSB
STALKER V	VR-4
STALKER IX	R-102
T BEAR	VR-5
T CHARLIE	VR-7
T COMMAND	VR-5
TITAN T	D-14
T CONTROL	VR-505
TENNA PHASE	CB-22 R-46
CB-26	D-22
TRAM	D-12 R-61
D-42	CD-11

MODEL	REMOVE THIS PART
-60	R-98=AM & R-112 SSB
-201A	VR-77
-300	TR-23
TRUETONE	CYJ4862A-87 RV-2
334	Q-15
NIDEN	2510 VR-112=AM & VR-104=SSB
600	VR-112=AM & VR-104=SSB
C-3	TR-14
RO-640	RV-5=AM & VR-6=SSB
C-122	Q-29 (near PL connector)
TAC	TRX-400 D-11
VECTOR	770 FVR-3
90	FVR-3
WARDS	GEN-730A VR-206
EN-775A	VR-206
EN-828A	VR-206
WHISTLER	700 Q-205
00	Q-305
XTAL	CB-7 D-18
B-11	D-14
SB-10	D-2
ZEXON	49 Q-201



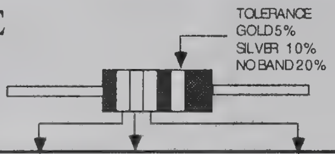
BOB Simpleton's Guide to Color codes

As seen in the **Amateur Radio Trader**

The electronic industry created a standard for color coding parts many, many years ago. The same color code is used on all different types of components. With a little effort, and a good memory, the basic color code can be memorized. In color code sequence is: BLACK, BROWN, RED, ORANGE, YELLOW, GREEN, BLUE, VIOLET, GRAY and WHITE. The number sequence that corresponses with the color code starts with zero; Black=0, Brown=1, Red=2, etc.

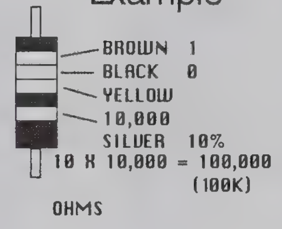
Components using color stripes and surface mount components use the 'significant' digit system paired with a multiplier digit, based on the powers of ten. An additional color stripe is also used to determine the accuracy or tolerance of the component. Higher accuracy components requires more significant digits to accurately describe the value. 5% accuracy parts use two 2 significent digits colors stripes followed by the multliper color stripe. 2% and 1% components often use 3 significent digit colors stripes .

RESISTOR COLOR CODE



COLOR	1st DIGIT	2nd DIGIT	MULTIPLY BY
BLACK	0	0	1
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
VIOLET	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	1,000,000,00
GOLD			0
SILVER			.1
			.01

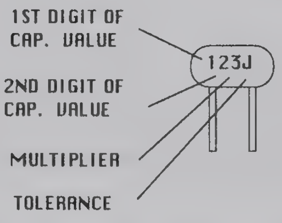
Example



Resistor standard values (significant digits)

10	brown	black	33	orange	orange
11	brown	brown	36	orange	blue
12	brown	red	39	orange	white
13	brown	orange	43	yellow	orange
15	brown	green	47	yellow	purple
16	brown	blue	51	green	brown
18	brown	gray	56	green	blue
20	red	black	62	blue	red
22	red	red	68	blue	gray
24	red	yellow	75	purple	green
27	red	purple	82	gray	red
30	orange	black	91	white	brown

CAPACITORS



MULTIPLIER		TOLERANCE		
	MULTIPLY BY		10pF or less	over 10pF
0	1	B	0.1pF	
1	10	C	0.25pF	
2	100	D	0.5pF	
3	1,000	F	1.0pf	1%
4	10,000	G	2.0pf	2%
5	100,000	H		3%
		J		5%
8	.01	K		10%
9	0.1	M		20%

Most common resistors are in the 5 to 10% tolerance range. Silver is used for 10% and gold is used for 5%. 20% resistors have no tolerance color bar.

One very common resistor is color coded: red red orange gold. Take a moment and see if you can use the attached resistor table and calculate the value..

If you calculated a 22,000, 5% resistor, you are correct. It is calculated like this: 22 x 10^3 = 22,000. What possible readings would you expect if you connected this resistor to an ohm meter?

Since it is a 5% tolerance resistor, the measured value will be between 19.800 and 24,200 ohms. That is calculated be allow 5% above and below the stated value.

Surface mount resistors do not use color stripes. The 2 significent digits and multiplier digit are printed right on the top of the component. These components are very, very small. The printed digits are often so small, you may need a magnifying glass to read them.

A surface mount resistor marked 103 would be a 10,000 ohm resistor (10k ohms). For everyone interested in mathematics, the formula is 10 x 10^3 = 10,000

A little practice will make reading resistors and other electronic componets easy as pi. 73, Bob

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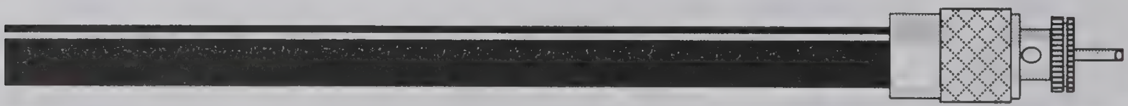
Radio	Modification	Page #
FT-10	Expanded RF	3
FT-11	Expanded RF	4
FT-23	Expanded RF / Alignment Controls	5
FT-26	Expanded RF / Alignment Controls	6
FT-33	Expanded RF / Alignment Controls	7
FT-40	Expanded RF	8
FT-41	Expanded RF	9
FT-50	Expanded RF	10
FT-51	Expanded RF	12
FT-73	Alignment Controls	13
FT-76	Expanded RF / Alignment Controls	14
FT-90	Expanded RF	15
FT-100	Expanded RF	16
FT-209	Expanded RF / Alignment Controls	18
FT-211	Expanded RF / Alignment Controls	19
FT-212	Expanded RF / Alignment Controls	20
FT-227	Expanded RF / Alignment Controls	21
FT-290	Expanded RF / Alignment Controls	22
FT-311	Expanded RF / Alignment Controls	23
FT-411	Expanded RF / Alignment Controls	24
FT-415	Expanded RF / Alignment Controls	25
FT-416	Expanded RF / Alignment Controls	25
FT-470	Expanded RF / Alignment Controls	26
FT-530	Expanded RF	28
FT-650	Expanded RF	32
FT-709	Expanded RF	33
FT-711	Expanded RF / Alignment Controls	34
FT-712	Expanded RF / Alignment Controls	35
FT-727	Expanded RF / Alignment Controls	36
FT-736	Expanded RF	37
FT-747	Expanded RF	38
FT-757GX	Expanded RF	39
FT-757GXII	Expanded RF	39
FT-767	Expanded RF / Alignment Controls	40
FT-811	Expanded RF / Alignment Controls	41
FT-815	Expanded RF / Alignment Controls	42
FT-816	Expanded RF	42
FT-817	Expanded RF	43
FT-840	Expanded RF	44
FT-847	Expanded RF	45
FT-890	Expanded RF	46

YAESU Radio Modifications

Radio	Modification	Page #
FT-900	Expanded RF	47
FT-920	Expanded RF	48
FT-990	Expanded RF	49
FT-1000	Expanded RF	50
FT-1000MP	Expanded RF	50
FT-1500	Expanded RF	52
FT-2070	Expanded RF	53
FT-2200	Expanded RF	54
FT-2311	Expanded RF	55
FT-2400	Expanded RF / Alignment Controls	56
FT-2500	Expanded RF	57
FT-2600	Expanded RF	58
FT-3000	Expanded RF	59
FT-4700	Expanded RF / Alignment Controls	60
FT-5100	Expanded RF / Alignment Controls	61
FT-5200	Expanded RF / Alignment Controls	63
FT-6200	Expanded RF / Alignment Controls	65
FT-7100	Expanded RF	66
FT-7400	Expanded RF / Alignment Controls	68
FT-8000	Expanded RF	69
FT-8100	Expanded RF	70
FT-8500	Expanded RF	71
FT-VX1	Expanded RF	72
FT-VX-5R	Expanded RF	73
FT-VX110	Expanded RF	74
FT-VX150	Expanded RF	74
FL-7000	Expanded RF	77
NC-29	Trickle Mode	76
NC-42	Charging Additional batteries	76
FT-ONE	Expanded RF	78
RESET		79
TNC		80



Receive and Transmit Expansion

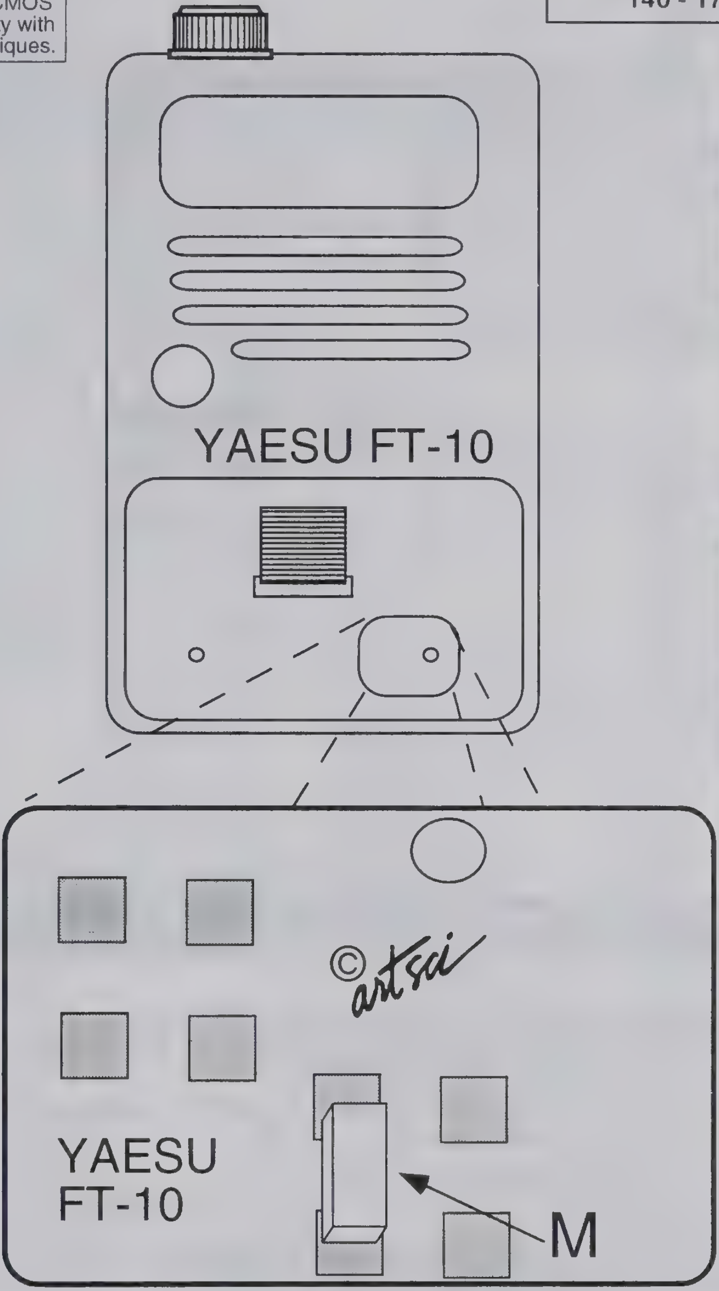
YAESU FT-10

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion
140 - 174 MHz



Modification Instructions

1. Remove the battery and the antenna.
2. Remove the 2 screws under the "N-Cd" Sticker.
3. Carefully lift the keypad and locate the jumper pads.
4. Locate and **unsolder the 0 ohm resistor at location "M"**
5. Reassemble the radio.
6. Reset the microprocessor.
   (Press and hold (Top-Notch) and [LAMP] button and turn the radio on)

YAESU FT-11R Receive and Transmit Expansion

Expansion Range

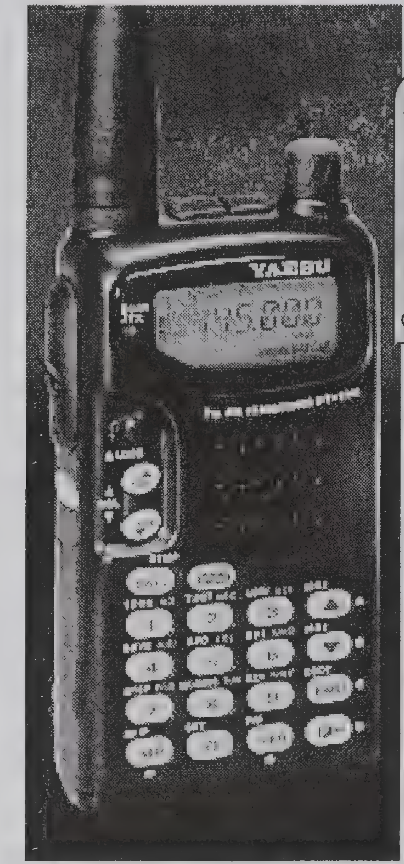
Not all versions will get full expansion

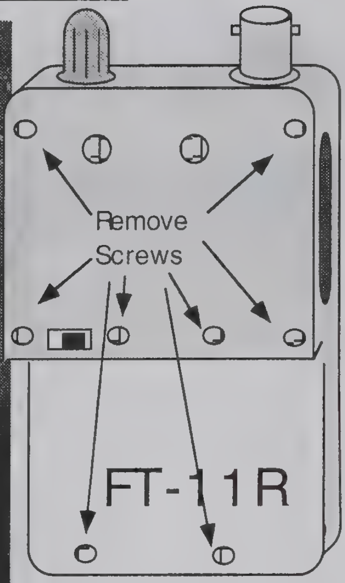
138 - 180 MHz

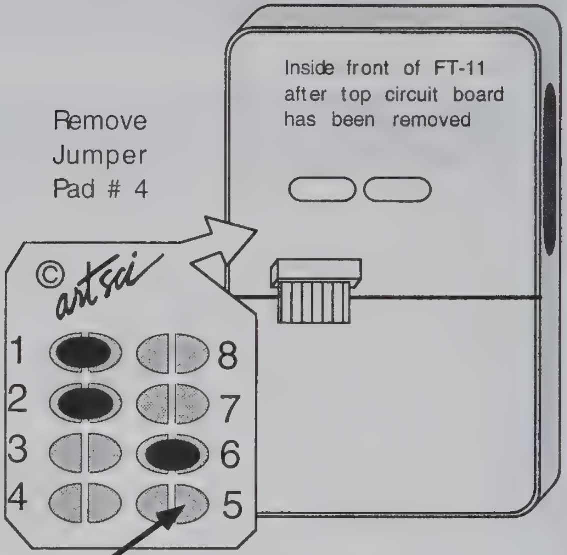
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.







Don't do this in the U.S.

Add Jumper #5
for Tone Burst.

To activate Tone Burst:
Press [Monitor] &
[PTT] at the same time.

Modification Instructions

1. Remove Battery and Antenna & belt clip.
2. Remove Screws from the back of the radio. See Drawing.
   (note location of battery release & hand strap clip, they will fall out)
3. Open radio and remove silver battery shield.
4. Remove two silver screws from top circuit board (below speaker/mic connector)
5. Gently pry top and bottom circuit boards apart.
6. Locate and **remove solder from pad #4.**
7. Reassemble the radio. Remember the battery clip and hand strap clips.
8. Reset the microprocessor.
   (Press and hold [UP] & [DOWN] arrow keys(on right side of keyboard) and turn the radio on.)
   (Press [MR], [VFO] & [2] and turn the radio on.)

Squelch adjustment

Press and hold [CALL], [UP vol] & [DOWN vol] and turn the radio on.
Press [UP MHz] button 3 times. The display will show SQL TI.
Inject a signal or tune to a strong signal (weather channel etc.)
Press [F] Button for 1/2 second this sets the level. ("AD" will blink on display)
Press the [MR] key to set the level
Press [CALL] to store the level in EEPROM memory.

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YAESU FT-23R

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

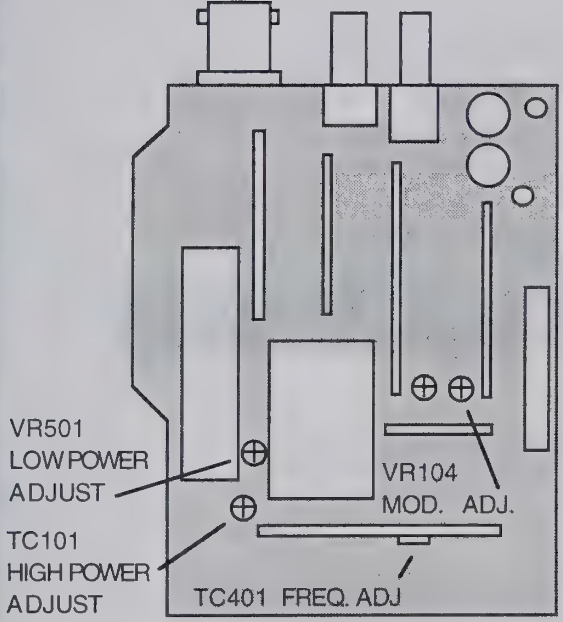
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

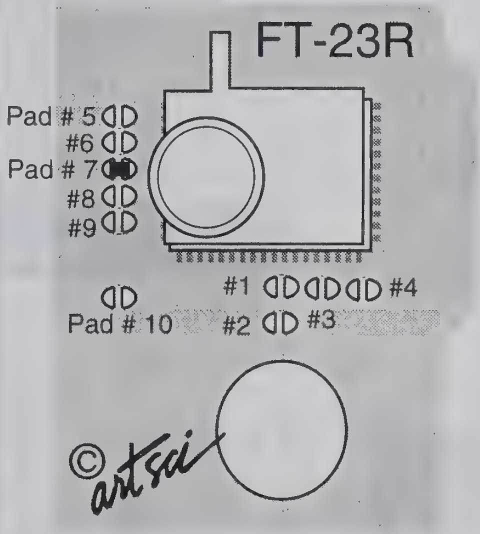
Expansion Range

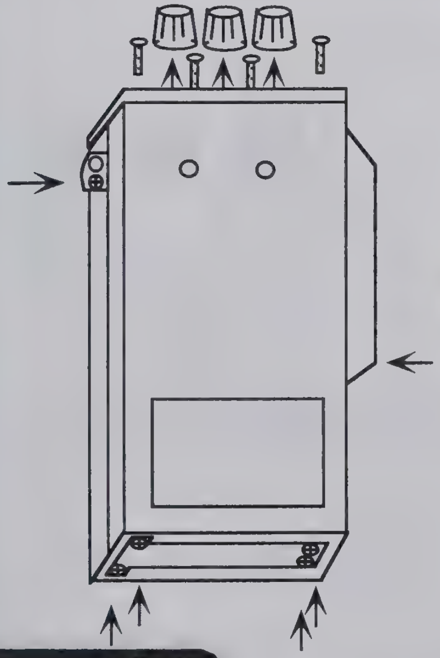
Not all versions will get full expansion
140 - 163.995 MHz

Modification Instructions

1. Remove Battery and Antenna.
2. Remove control knobs, screws, top panel, battery mounting track & body screws and open Radio
3. **Remove solder bridge from Pad # 7**
4. Reassemble radio.







Repeater Offset control:

1. PRESS AND HOLD [RPT] & TURN ON THE RADIO.
2. DIAL OFFSET & PRESS [RPT]

Solder Pad functions

Pad #1	Filter for 140-164 RX
Pad #2	Filter for 164-?? RX
Pad #3&4	Step selection 20 or 25 kHz 3&4 unsoldered = 10 kHz step
Pad #5	5 MHz offset
Pad #6	1.6 MHz offset 5&6 unsoldered = 600 kHz offset
Pad #7,8&9	Band selections
Pad #10	Unknown

YAESU FT-26

Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

135 - 174 MHz

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Modification Instructions

1. Remove Battery and Antenna.
2. Remove the 4 screws holding the battery track.
3. Remove the 2 screws in the back case.
4. Carefully separate the front cover.
5. Locate and **remove solder on Jumper pad 10.** (on control board)
6. Solder jump pads 1, 3, 7 and 8.
7. Reassemble the radio.
8. Turn radio on and each channel indicator will blink.
9. Enter the following frequencies. (use the [F] & up arrow keys)

CH. 1	135.000	Press [D/MR] Lower Rx limit
CH. 2	174.000	Press [D/MR] Upper Rx limit
CH. 3	135.000	Press [D/MR] Lower Tx limit
CH. 4	174.000	Press [D/MR] Upper Tx limit

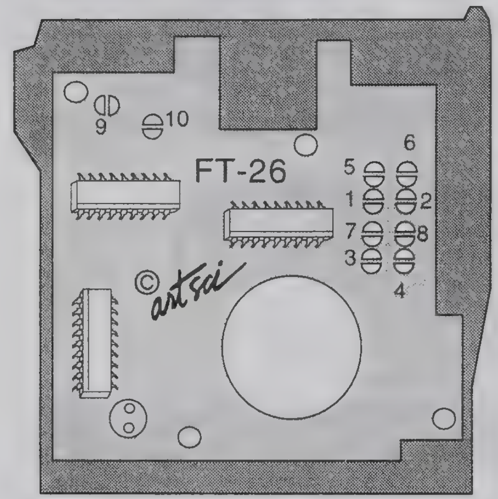
Reset Commands

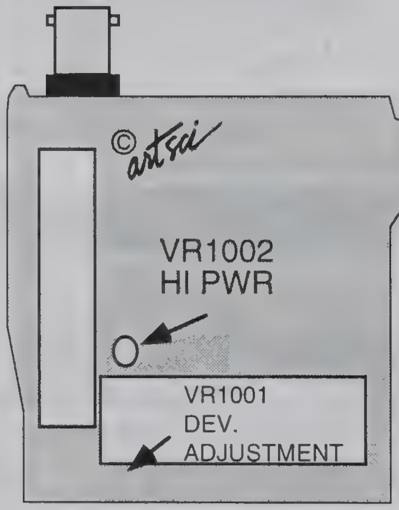
Soft RESET

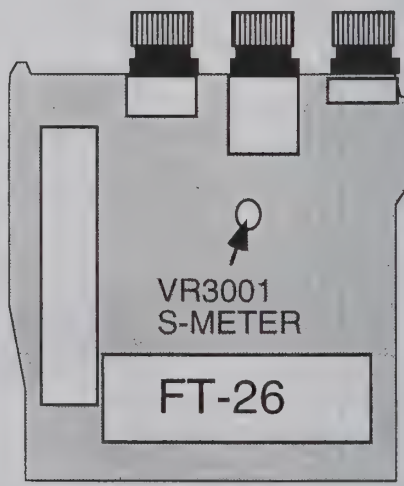
Press and hold [T] & [REV] and turn power on.

Master RESET

Press and hold [D/MR] & [T] & [REV] and turn radio on, then enter band Limits below.







Receive and Transmit Expansion

YAESU FT-33R

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

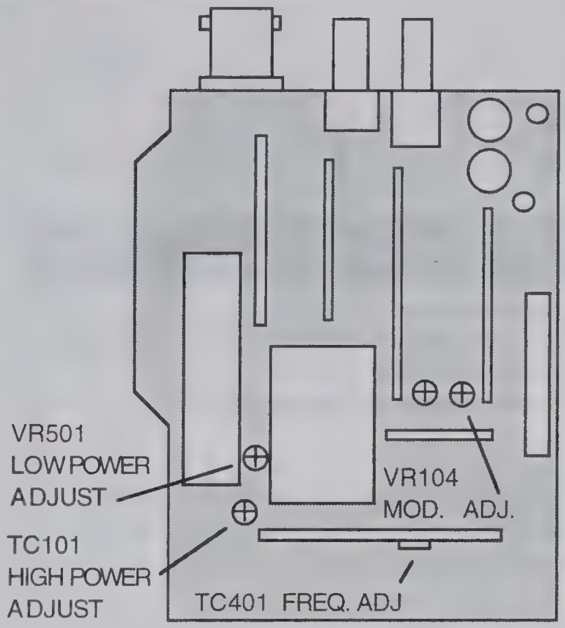
CAUTION:

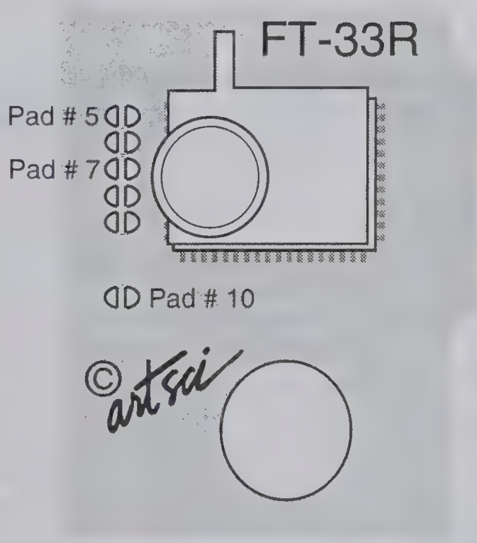
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

Unknown





Repeater Offset control:

1. PRESS AND HOLD [RPT] & TURN ON THE RADIO.
2. DIAL OFFSET & PRESS [RPT]

Modification Instructions

1. Remove Battery and Antenna.
2. Remove control knobs, screws, top panel, battery mounting track & body screws and open Radio
3. For display 220-550 MHz **Pads 7,8 and 9 are open**
   For display 50-300 MHz Pads 8 and 9 are open and 7 is bridged
4. Reassemble radio.

YAESU FT-40

Receive and Transmit Expansion

Expansion Range

Not all versions will get full expansion

420 - 470 MHz

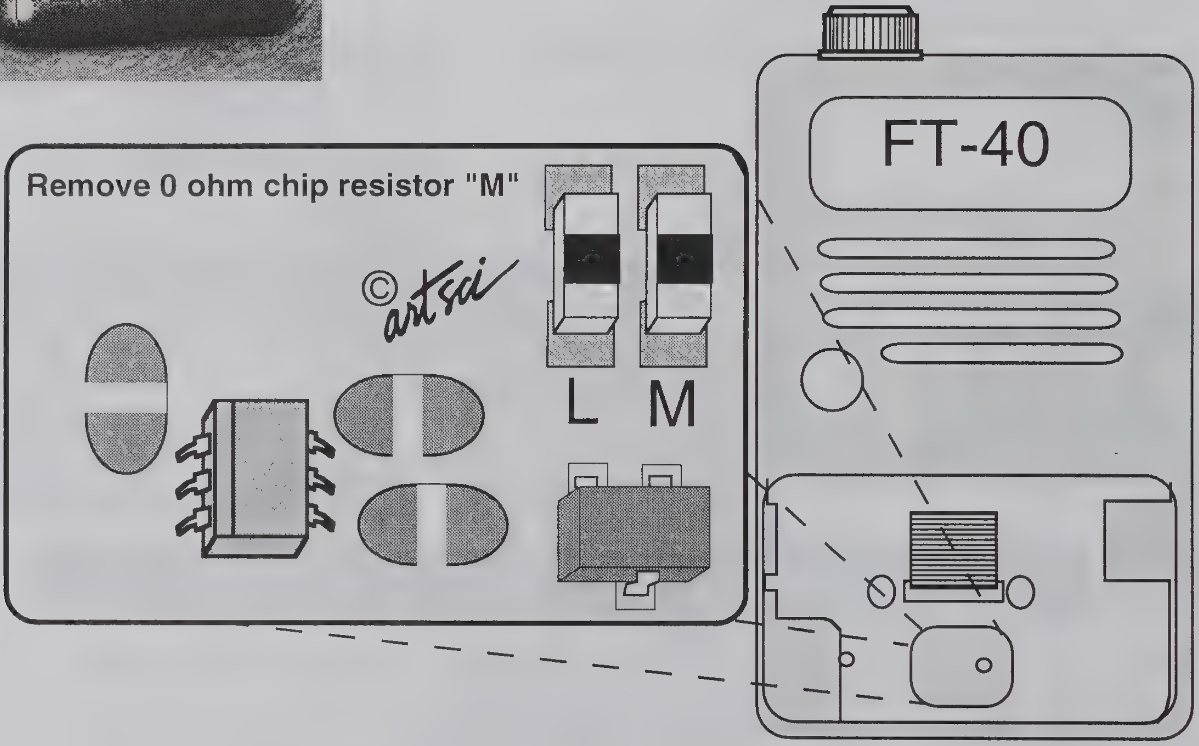
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Modification Instructions

1. Remove the battery and the antenna.
2. Remove the 2 screws under the "N-Cd" Sticker.
3. Carefully lift the keypad and locate the jumper pads.
4. Locate and **unsolder the 0 ohm resistor at location "M"**
5. Reassemble the radio.
6. Reset the microprocessor.
   (Press and hold [Squelch knob] and [DIAL knob] and turn power on.)
   (Press and hold [DIAL knob] and [LAMP] button and turn the radio on)



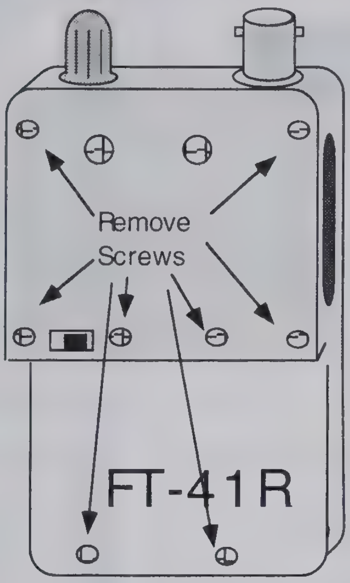
Receive and Transmit Expansion

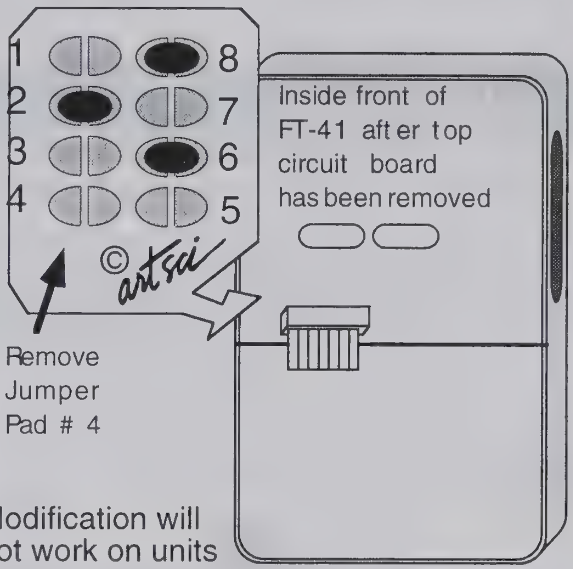
YAESU FT-41

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
420 - 463 MHz





Modification will not work on units with serial numbers: xx17xxxxx or greater

Modification Instructions

1. Remove Battery and Antenna & belt clip.
2. Remove Screws from the back of the radio. See Drawing.
   (note location of battery release & hand strap clip, they will fall out)
3. Open radio and remove silver battery shield.
4. Remove two silver screws from top circuit board (below speaker/mic connector)
5. Gently pry top and bottom circuit boards apart.
6. Locate and **remove solder from pad #4.**
7. Reassemble the radio. Remember the battery clip and hand strap clips.
8. Reset the microprocessor.
   (Press and hold [UP] & [DOWN] arrow keys(right side of keyboard) and turn the radio on.)
   (Press [MR], [VFO] & [2] and turn the radio on.

Squelch Adjustment

Press and hold [CALL], [UP vol] & [DOWN vol] and turn the radio on.
Press [UP MHz] button 3 times. The display will show SQL TI.
Inject a signal or tune to a strong signal (weather channel etc.)
Press [F] Button for 1/2 second this sets the level. ("AD" will blink on display)
Press the [MR] key to set the level
Press [CALL] to store the level in EEPROM memory.

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YAESU FT-50R Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

122 MHz - 215 MHz
312 MHz - 500 MHz

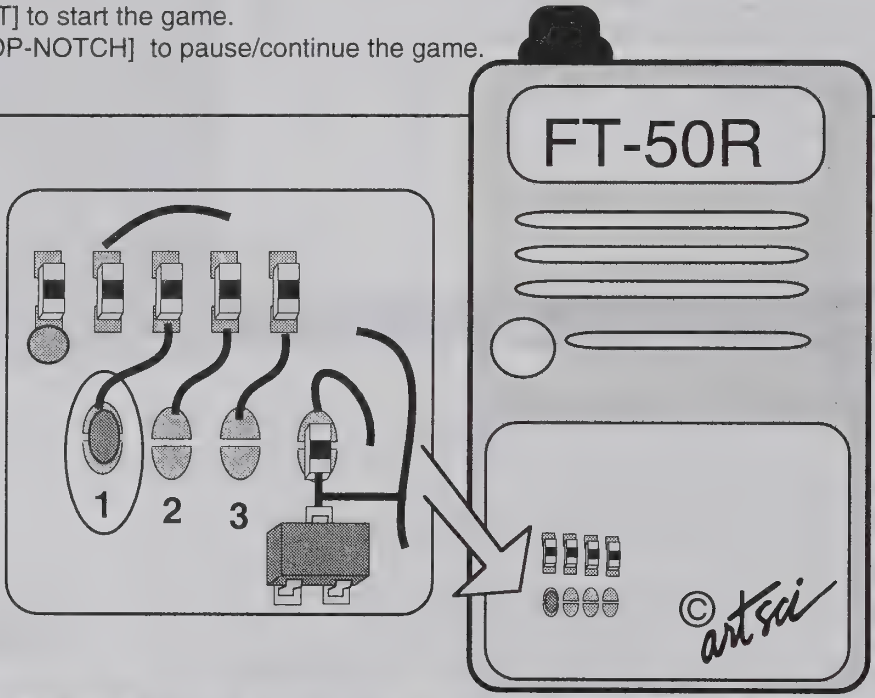
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Perfect "10" Challenge Game

The FT-50 includes a built-in COUNT TO "10" Challenge Game. The Object of the game is to take the number that appears on the screen and add a number from the keypad to equal "10".

EXAMPLE: If a "6" appears on the screen, you should press [4] and then [F]. If a "0" appears on the screen, you should press [1] [0] and then [F]. Remember you always want the total to equal "10". As you continue to play, the game will speed up. At the end of the game, your score is displayed.

Press and hold [MR] and turn the radio on.
Adjust the volume control for sound level.
Turn the [TOP-NOTCH] control to adjust the speed.
Press [PTT] to start the game.
Press [TOP-NOTCH] to pause/continue the game.



Modification Instructions

1. Remove Battery and Antenna .
2. Remove the Ni-Cd sticker.
3. Remove the two silver screws securing the keypad.
4. Carefully, lift off the keypad and locate the jumper pads.
5. **Locate and Jumper pad JP1**
   (if your radio has JP1 jumpered, REMOVE the jumper)
6. Re-install the keypad and the two screws
7. Reassemble the radio.
8. Press and hold [Top-Knob] and [LAMP] while turning the radio on.
9. Turn the radio off.
10. Turn the radio on (Mod complete)

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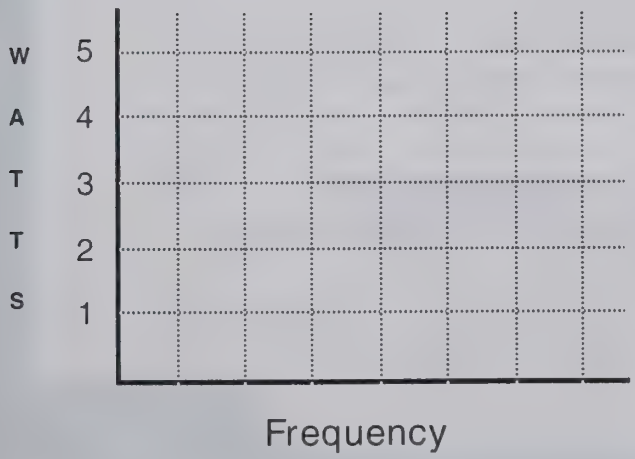
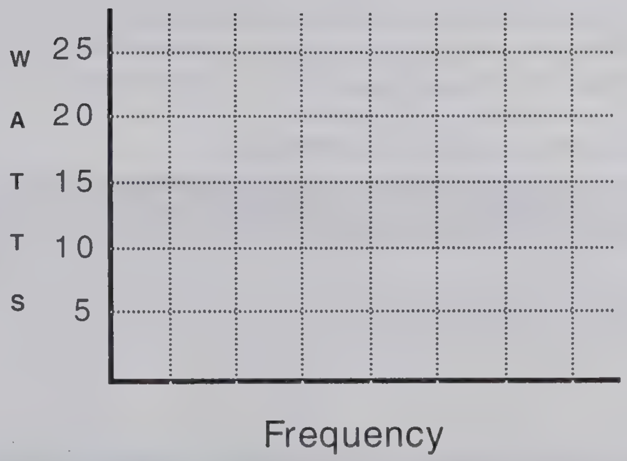
Performance Report

Radio ______________________________ Date ____________

Owner : Name ____
Address ____
City ________________ St. ______ Zip ____________
Phone (   )   - ________________________________

Description	Before	After
Power out (Low)	________ Watts	________ Watts
Power out (High)	________ Watts	________ Watts
Frequency Error (Simplex)	________ Hz	________ Hz
Frequency Error (Offset)	________ Hz	________ Hz
Receive Sensitivity (Mid-band)	________ uv	________ uv
Receive Sensitivity (____MHz)	________ uv	________ uv
Receive Sensitivity (____MHz)	________ uv	________ uv
PL Deviation	________ Hz	________ Hz
DTMF Deviation	________ KHz	________ KHz
Audio Deviation	________ KHz	________ KHz
Lowest usable Freq @ .5 Pwr	________ MHz	________ MHz
Highest usable Freq @ .5 Pwr	________ MHz	________ MHz





YAESU FT-51R Receive and Transmit Expansion

Expansion Range

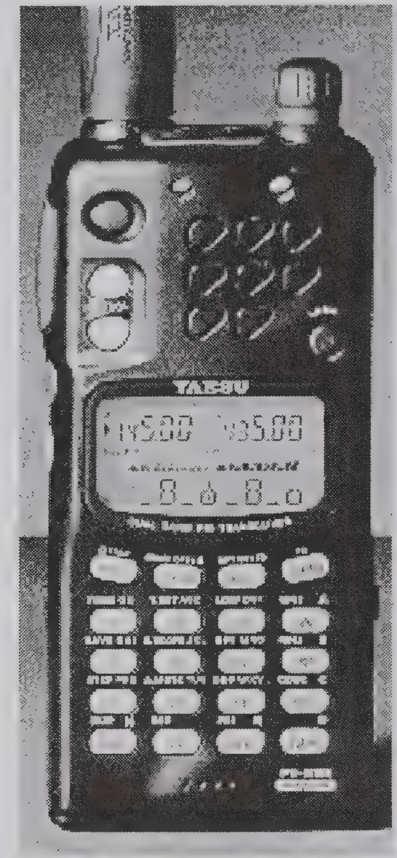
Not all versions will get full expansion

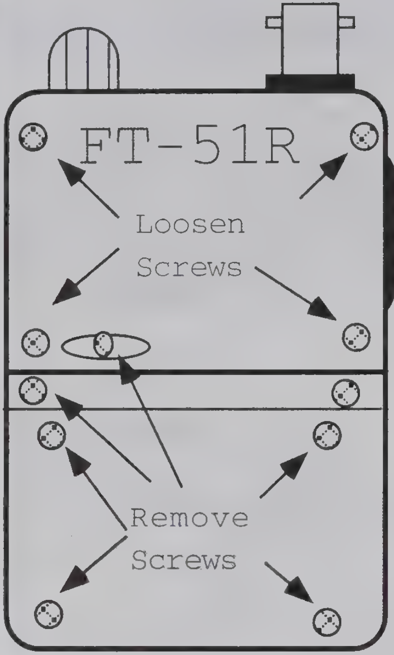
122 MHz - 180 MHz , 320 - 482 Mhz TX
110 MHz - 180 MHz, 320 - 500 Mhz RX

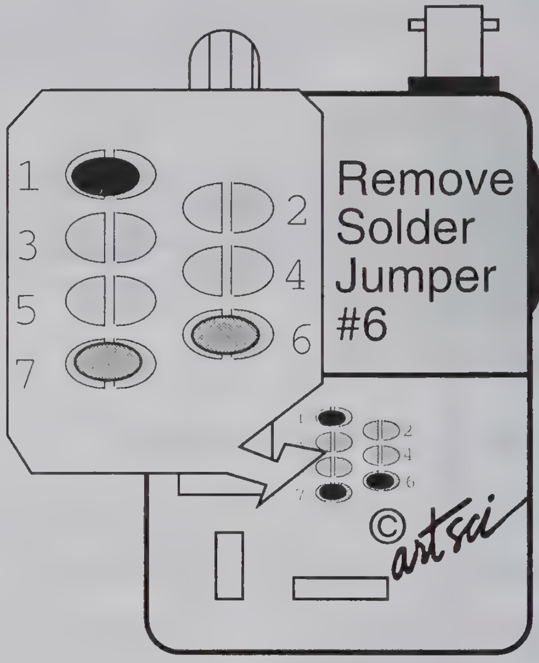
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.







Stock Pads 1, 6 & 7

One report states that the modification disables the ability to clone the radio.

Modification Instructions

1. Remove Battery and Antenna .
2. Remove the six black screws on the rear plastic cover. (See drawing)
3. Remove the one small black screw on the battery slide button.
4. Loosen the four black screws on the upper rear cover and slightly seperate the cover.
   (DO NOT REMOVE THESE SCREWS)
5. Remove the "L" plastic cover. (USE CAUTION NOT TO DAMAGE THE RIBBON CABLE)
6. Locate and **unsolder jumper pads # 6 & 7** (JP1006).
   (Some models may have a small jumper wire on Pad #6, cut it.)
7. See instructions below then reassemble the radio.
8. **Reset the microprocessor.** (Press and hold [Mhz UP] & [MHz DOWN] and turn on the radio.)

Some models require the following:

9. Press and hold both volume keys and the [CALL] button and turn the radio on.
10. Press [F/M] button for 1 second, then press [Mhz UP] arrow until the display reads "BAND 7".
11. Press [F/M], Press [CALL] button the radio will power down.
12. Solder jump Pad # 7.
13. **Reset the microprocessor.** (Press and hold [Mhz UP] & [MHz DOWN] and turn on the radio.)

Alignment Controls

YAESU FT-73R

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

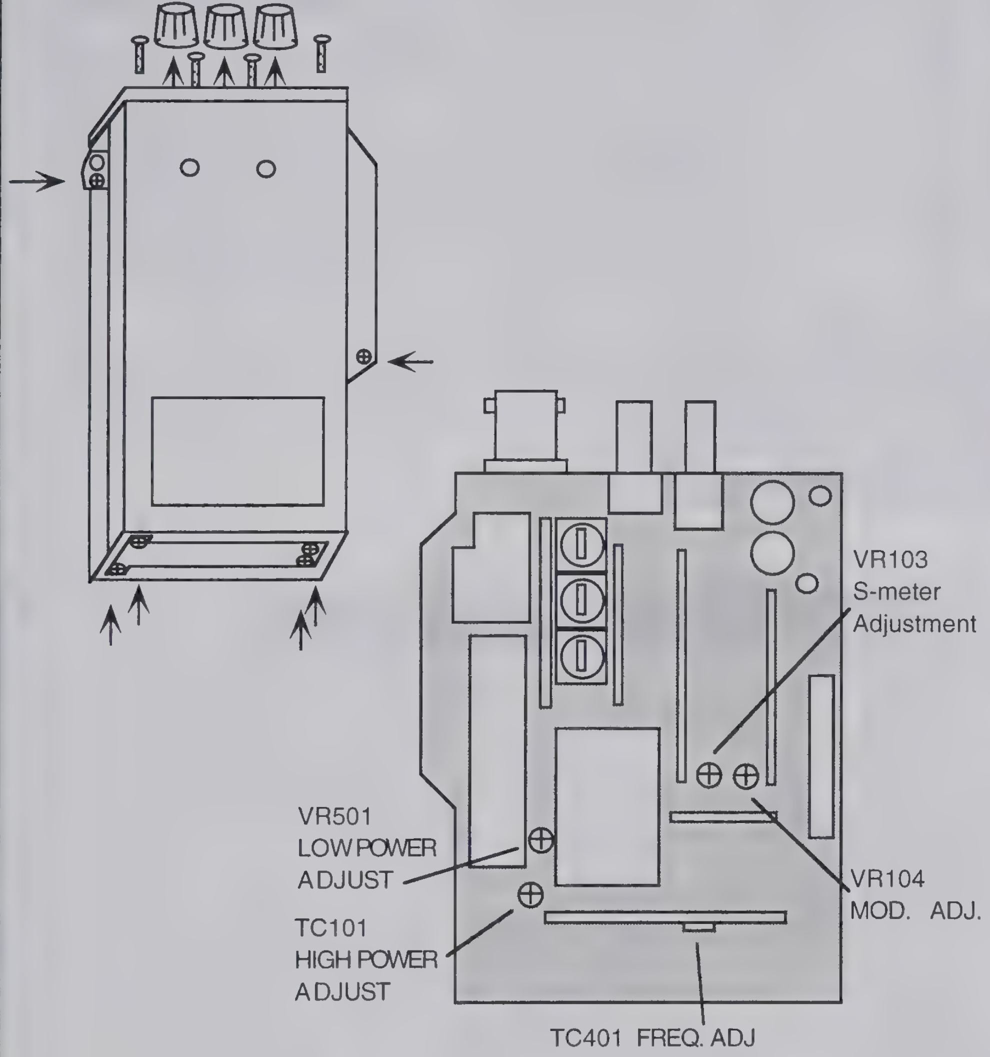
Expansion Range

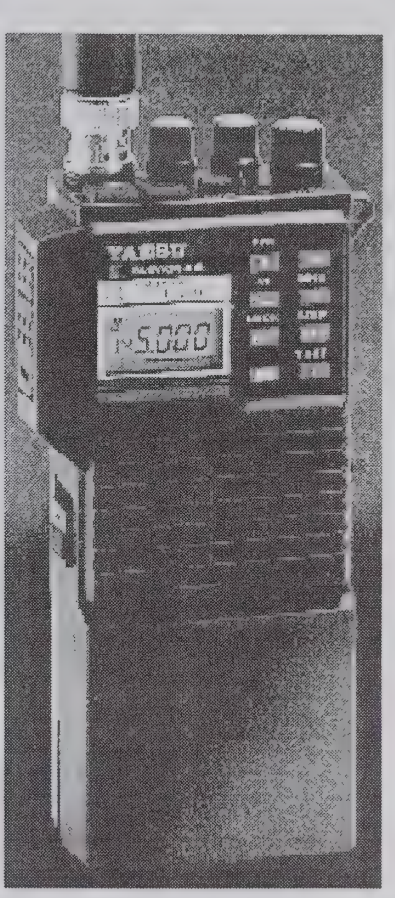
Not all versions will get full expansion

Unknown

Repeater Offset control:

1. PRESS AND HOLD [RPT] & TURN ON THE RADIO.
2. DIAL OFFSET & PRESS [RPT]





Modification Instructions

1. Remove Battery and Antenna.
2. Remove control knobs, screws, top panel, battery mounting track & body screws and open Radio
3. Make adjustments.
4. Reassemble the radio.

Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

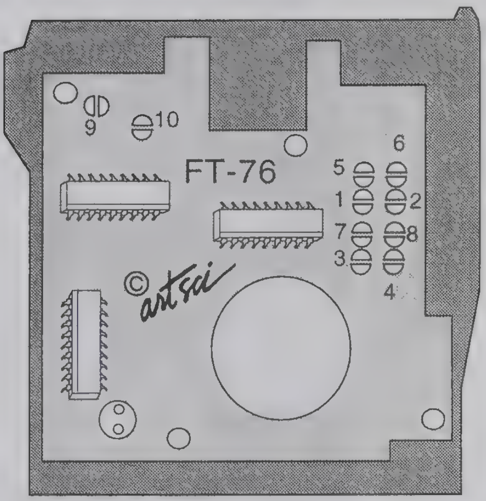
Not all versions will get full expansion

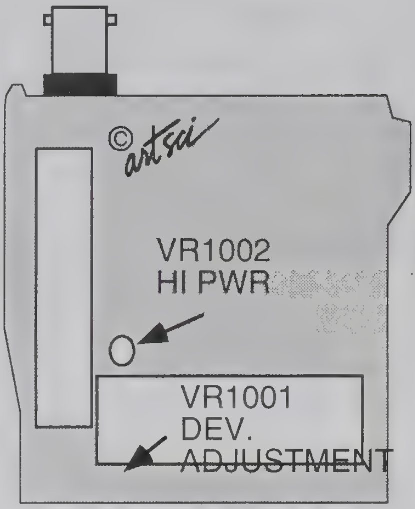
400 - 485 MHz RX

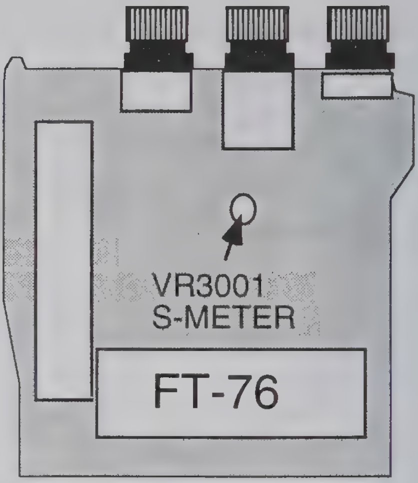
415 - 470 MHz TX

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.







Modification Instructions

1. Remove Battery and Antenna.
2. Remove the 4 screws holding the battery track.
3. Remove the 2 screws in the back case.
4. Carefully separate the front cover.
5. Locate and **remove solder on Jumper pads 4 and 7**. (on control board)
6. **Solder jump pads 1, 3, 5, 8, 9 and 10** (old mod had pad 4 in place of 5)
7. Reassemble the radio.
8. Turn radio on and each channel indicator will blink.
9. Enter the following frequencies. (use the [F] & up arrow keys)

CH. 1	400.000	Press [D/MR] Lower Rx limit
CH. 2	485.000	Press [D/MR] Upper Rx limit
CH. 3	415.000	Press [D/MR] Lower Tx limit
CH. 4	470.000	Press [D/MR] Upper Tx limit

Soft RESET Press and hold [T] & [REV] and turn power on.

Master RESET Press and hold [D/MR] & [T] & [REV] and turn radio on, then enter band Limits below.

Receive and Transmit Expansion

YAESU FT-90

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

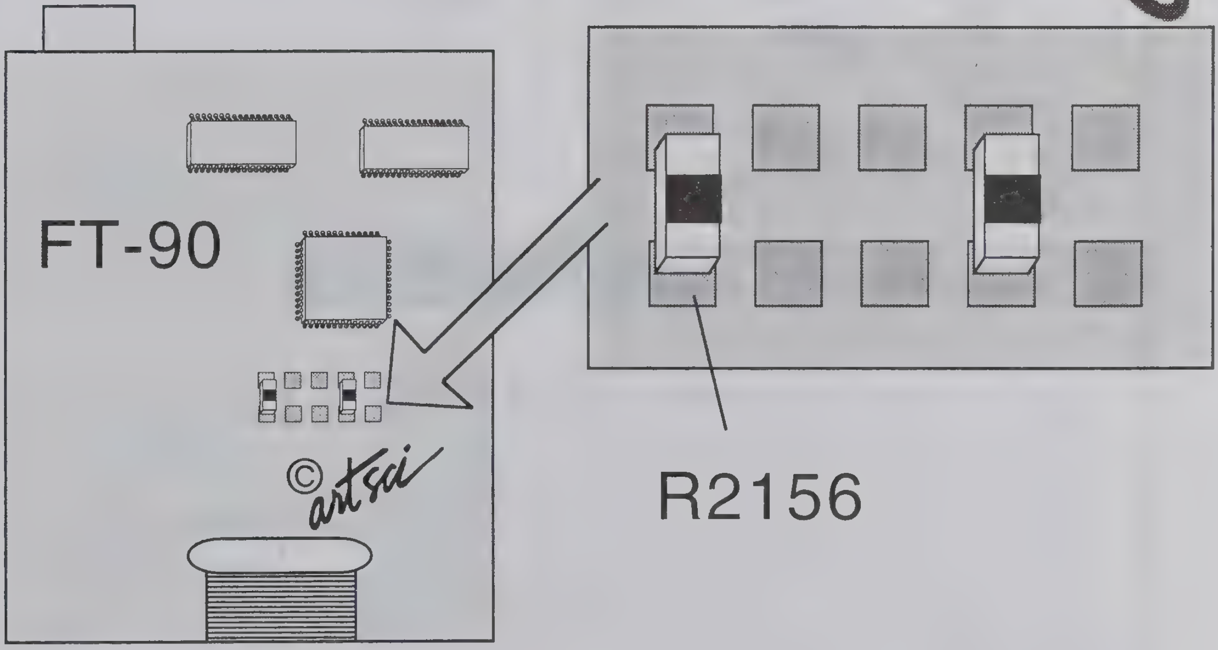
Expansion Range

Not all versions will get full expansion

130 - 180 MHz
410 - 480 MHz

Modification Instructions

1. Remove power and antenna.
2. Remove 4 screws and open Bottom case.
3. Locate and **remove Resistor R2156 .**
3. Reassemble the radio.
12. **Reset the microprocessor.**
(Press [Left Arrow] & [Right Arrow] & [DISP/SS] and turn power on)



Receive and Transmit Expansion

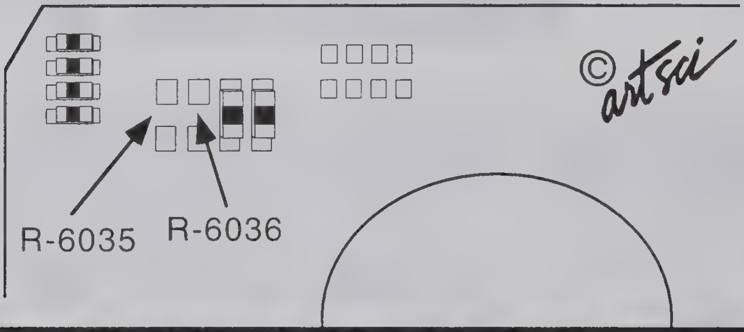
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

RX: 30KHz-824MHz, 849MHz-859MHz, 894MHz-961MHz.
TX: 1.8MHz-30MHz, 50MHz-54MHz, 140MHz-174MHz, 420MHz-470MHz

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Modification Instructions

1. Remove Front Panel from body.
2. Open rear cover of front panel.
3. Locate and **remove R6035 & R6036** on the display board. (R6035 may already be removed)
4. Reassemble the front panel and radio.
5. Press and hold [DWN] & [STEP] and press [POWER] for 1 second.
6. Display will read 'r on' quickly.
7. Dial 375.72727 MHz and turn power off. (You may need to use LSB or cw to get the last digit)
8. Press and hold [DWN] & [STEP] and press [POWER] for 1 second.
9. Display will read 'HF' quickly.
10. Dial 549.61163 MHz and turn power off.
11. Press and hold [DWN] & [STEP] and press [POWER] for 1 second.
12. Display will show 'vU on' quickly.
13. Turn radio off.

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BOB Simpleton's Guide to PL Decoding/speaker Muting

It is sometimes useful to keep your radio on at all times while waiting for an important call. However the chatter of other users may become a problem.

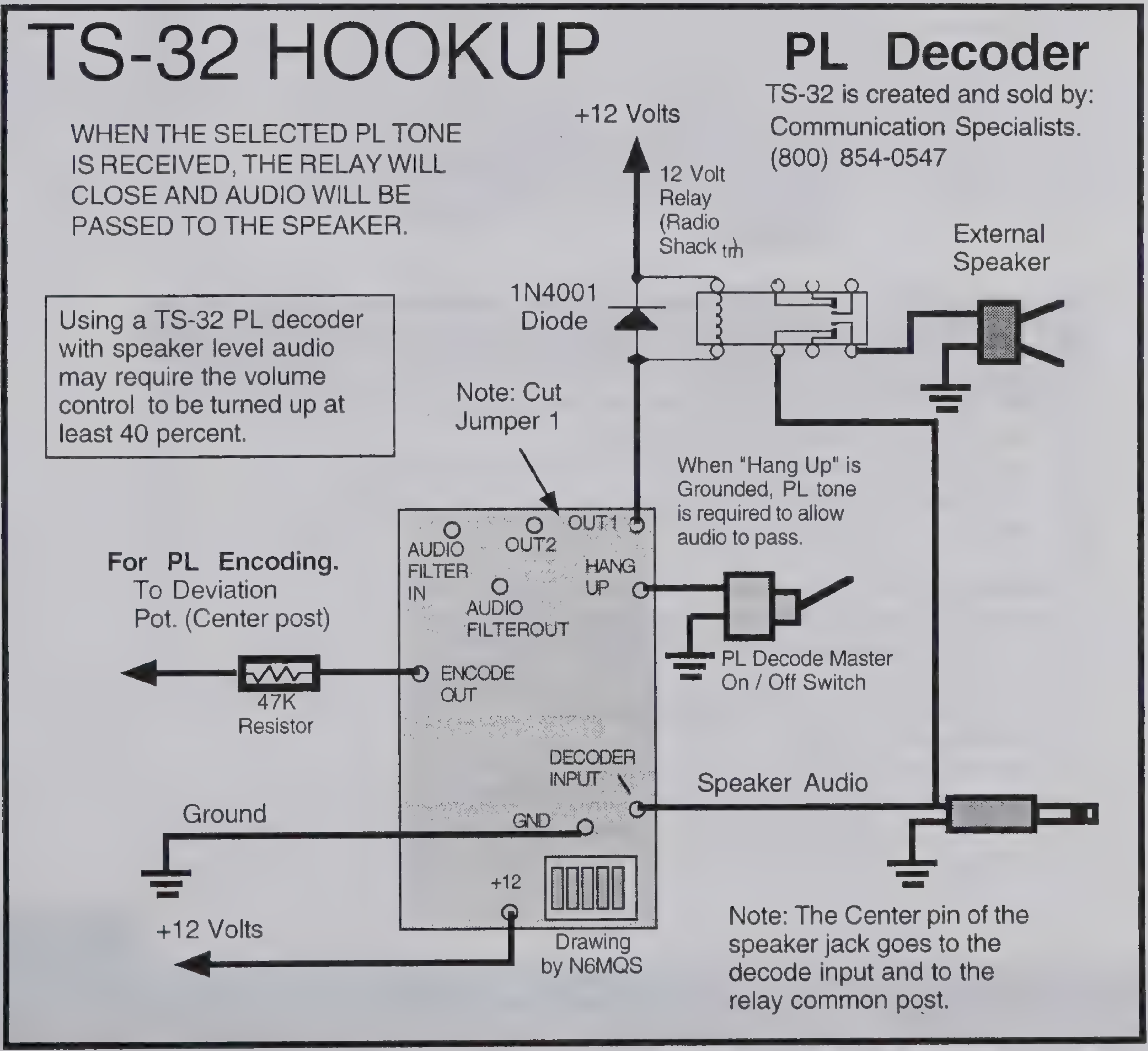
My good friend Bill likes to have his wife Jan monitor the base radio at home. During high radio traffic times, she will turn the volume down to avoid listening to others. It is then to low for her to hear Bill when he calls.

Bill put together this simple PL decoder circuit and attached it to his base radio. Now the radio speaker is disconnected unless the proper subaudable PL tone is used. Bill always transmits the correct PL tone when he wants to talk to Jan at home. He keeps the base radio volume very high so Jan can hear him calling from almost anywhere in the house.

His circuit was created using the popular TS-32 PL Decoder by Communication Specialists. Most repeater systems use this decoder because it is very reliable and simple to use.

He has included a defeat switch to remove the PL requirement when using the radio for normal two-way communications. The TS-32 PL Decoder board has a special "HANG UP" pin that is grounded through the switch and will keep the relay triggered and all audio will pass to the speaker.

Bill suggested using the other side of the relay to activate a horn, buzzer or light of some kind. I built one of these circuits and used it in the car to flash a light when one of my friends call me. I see the light and turn the stereo down and answer the call. 73 and have some fun.



TS-32 HOOKUP

PL Decoder

TS-32 is created and sold by:
Communication Specialists.
(800) 854-0547

WHEN THE SELECTED PL TONE IS RECEIVED, THE RELAY WILL CLOSE AND AUDIO WILL BE PASSED TO THE SPEAKER.

Using a TS-32 PL decoder with speaker level audio may require the volume control to be turned up at least 40 percent.

Note: Cut Jumper 1

When "Hang Up" is Grounded, PL tone is required to allow audio to pass.

Note: The Center pin of the speaker jack goes to the decode input and to the relay common post.

Drawing by N6MQS

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

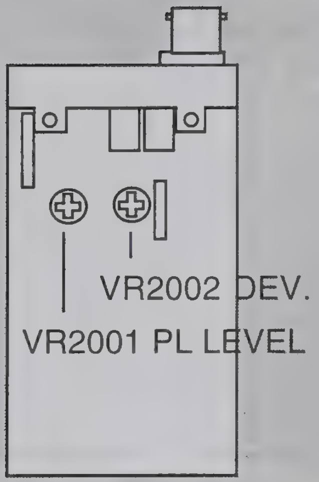
Expansion Range

Not all versions will get full expansion

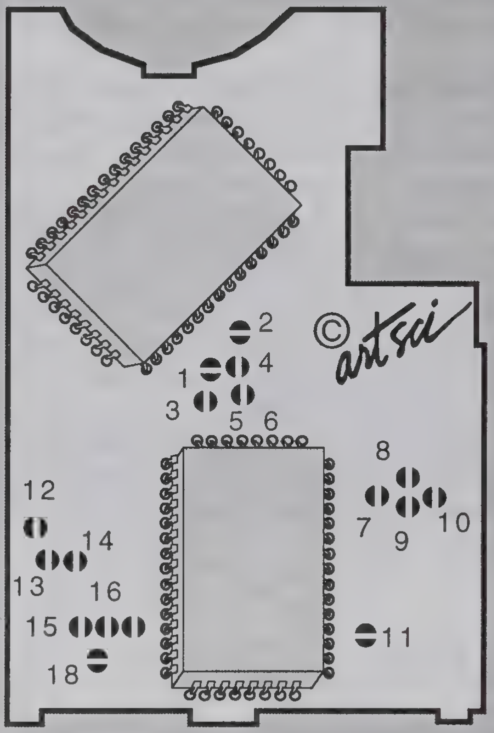
Unknown

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



FT-209



Modification Instructions

1. Remove battery and antenna.
2. Remove battery screws, belt clip screws and side strap screws.
3. Remove black trim on sides of the radio.
4. Remove the two side screws and slide the u-shaped back cover off.
5. Remove the four tiny Phillips screws holding the front panel on.
6. Fold panel to the right to open the radio.

Untested out of band mod #1: **Jumper pads 1,7,9,10 & 13.**
Untested out of band mod #2: **Jumper pads 7,9,10,11& 13.**
Factory default is pads 1,9 & 13.

7. Locate alignment pots. Make adjustments
8. Reassemble the radio.
9. Reset the microprocessor (If desired)
10. Enter 1440 [D], 1480 [D], 1440 [D], 1480 [D], 0600 [SHIFT]
    Note: RX range of 144.0 - 148.0 MHz and TX range of 144.0 - 148.0 MHz

Receive and Transmit Expansion

YAESU FT-211

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

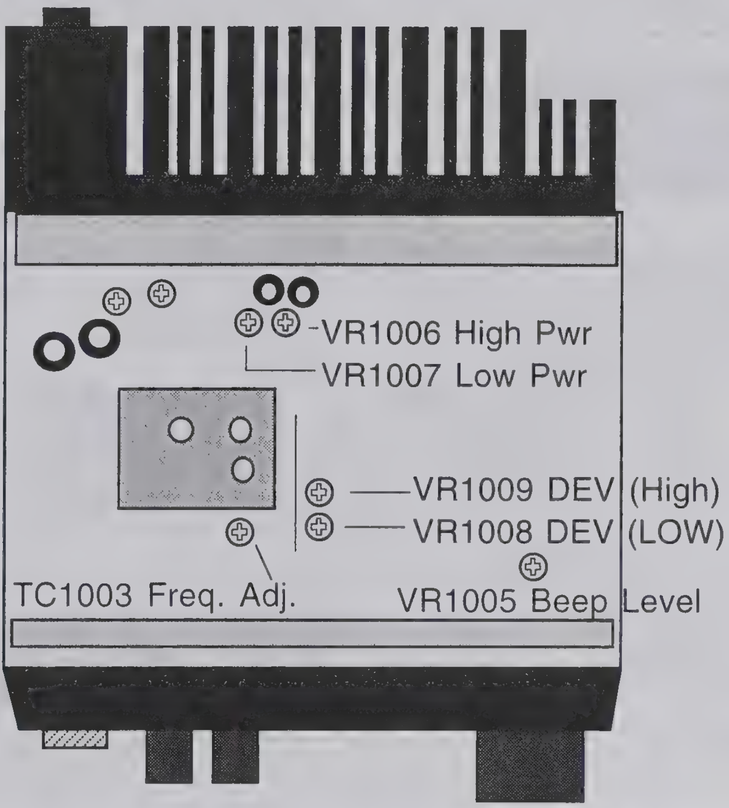
CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

Unknown



Modification Instructions

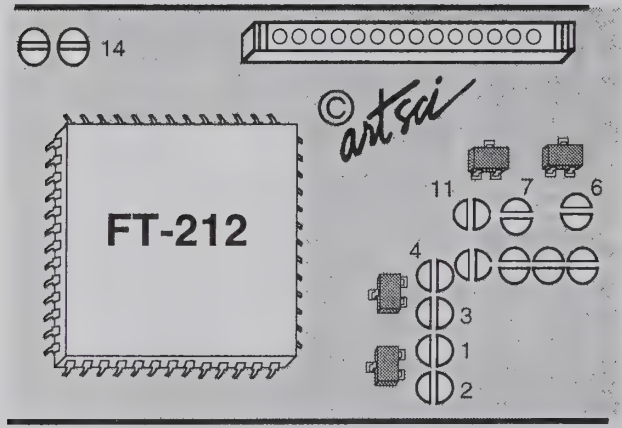
1. Remove five screws from the top cover and remove the cover.
2. Remove five screws from the bottom cover and remove the cover.
3. Unplug the speaker.
4. Remove the four screws holding the front panel.
5. Locate jumper pad number 7.
6. **Solder bridge pad number 7.**
7. Locate the reset pins (Located on the front panel and clearly marked).
8. **Short the reset pins together for one second.**
9. Reassemble the radio.

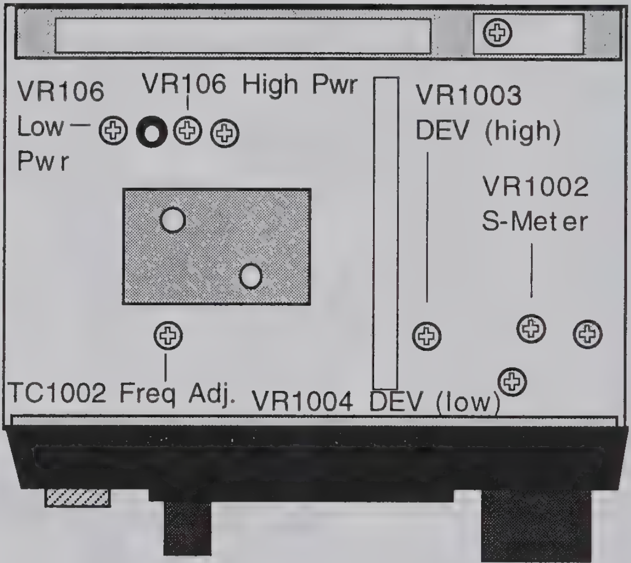
YAESU FT-212 Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
140 - 164 MHz
Auto offset lost





Modification Instructions

1. Unplug the DC power cable from the radio.
2. Remove the top and bottom covers.
3. Remove the speaker.
4. Remove the knobs and nuts from the front panel.
5. Remove the three screws from the control unit.
6. Remove the Control unit from the front panel.
7. **Locate & remove solder from pad #1 on control unit.**
8. **Locate & solder jumper Pads 3,4,11 and 14.**
9. Replace the control unit on the front panel.
10. **Reset the microprocessor.** (using a jumper short D09 on the control unit to ground on the radio. Do not apply power).
11. Reassemble the radio. Replace knobs, screws etc.
12. Apply DC power and turn radio on.
13. Press [MHz] & use the control knob to enter 140 and press [D/MR]. (lower limit)
14. Press [MHz] and use knob to enter 174 and press [D/MR]. (upper limit)
15. Press [F] and then [RPT] button. use the control knob to enter 0.600. Press the [RPT] button.

Receive and Transmit Expansion

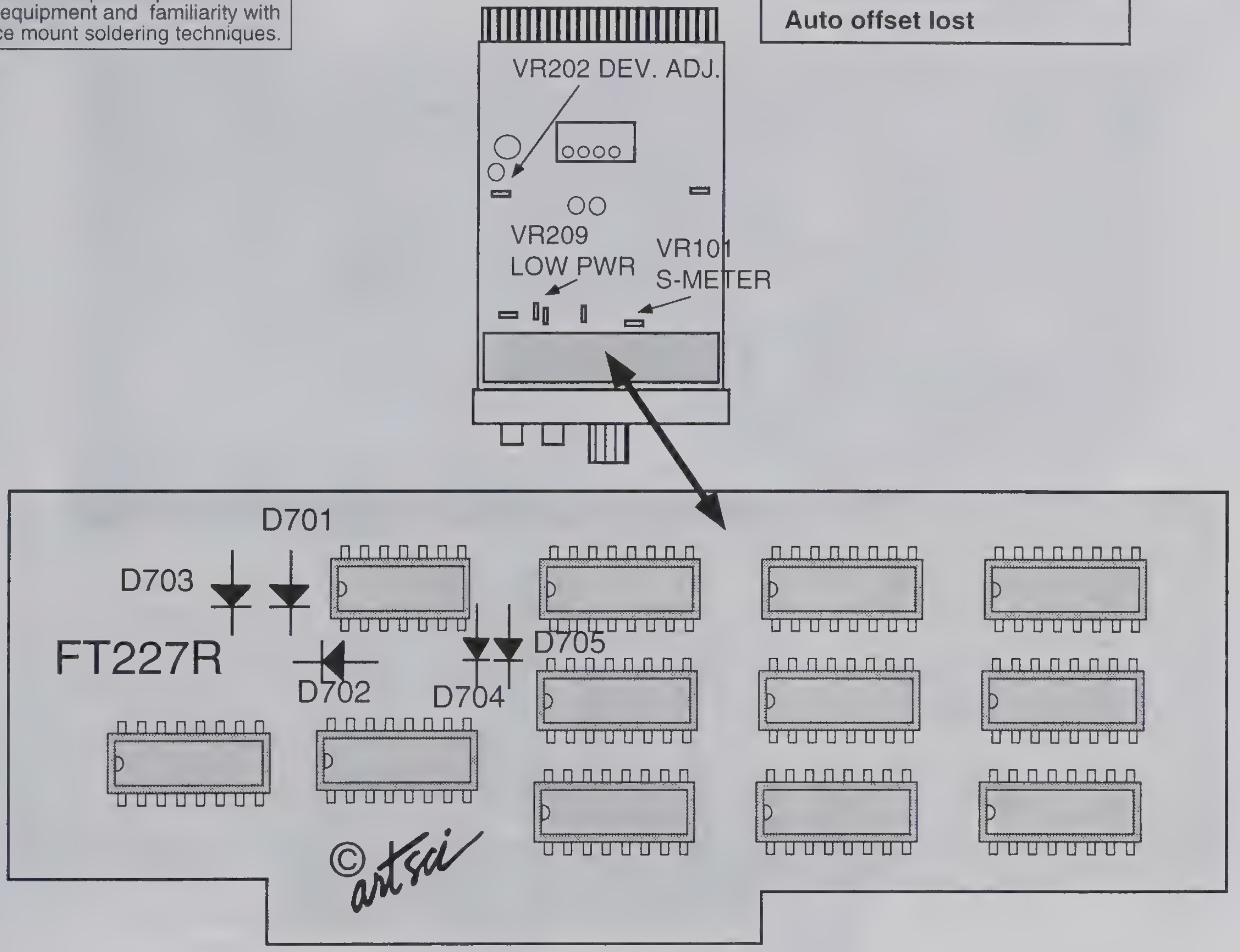
YAESU FT-227R

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion
143.990 - 149.000 MHz
Auto offset lost



Modification Instructions

1. Unplug the power from the radio.
2. Open radio and locate the PLL CONT. UNIT.
3. **Remove D701 and D702.** Do not place in a jumper.
4. **Locate Q712 (MC14028B), and break the connection to Pin 6. (Blue wire)**
5. **Connect pin 1 of Q711 (red wire) to ground.**
6. Reassemble radio

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YAESU FT-290 MKII Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

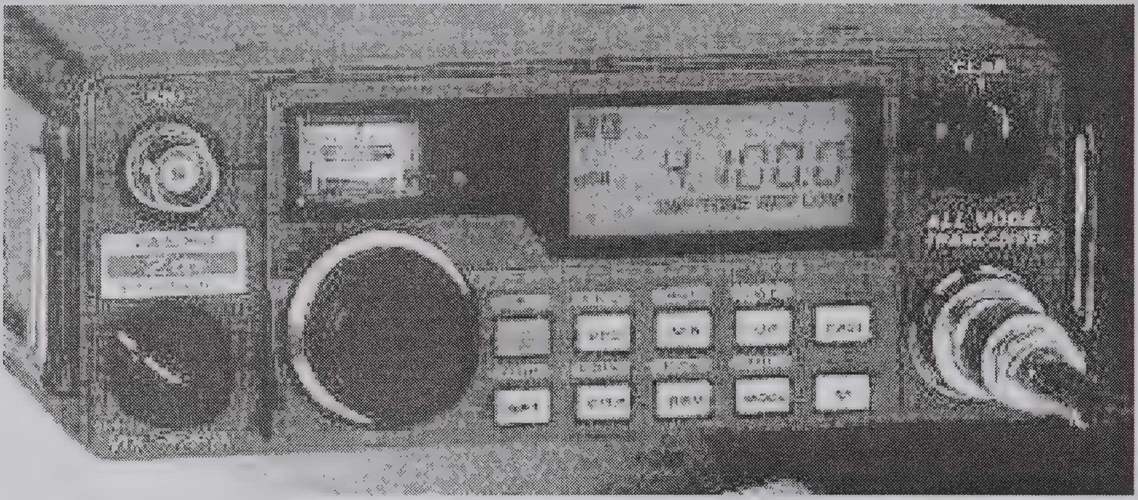
Expansion Range

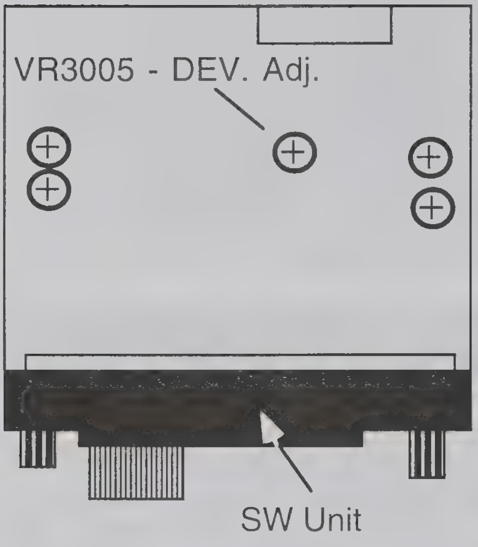
Not all versions will get full expansion

Unknown

CAUTION:

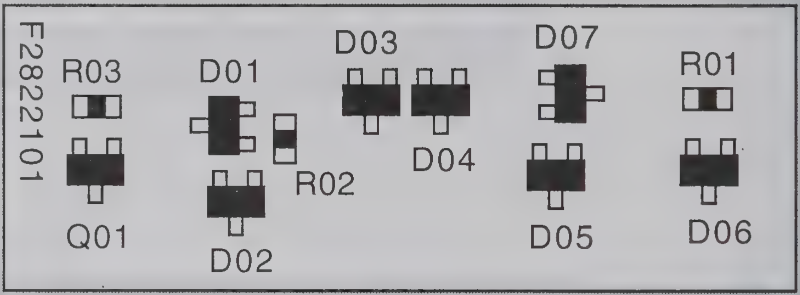
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.





D01	D03	R02	R03	
●	●	○	●	144 - 148 MHz
●	●	○	○	140 - 150 MHz
●	●	●	○	144 - 146 MHz
●	○	●	○	144 - 154 MHz

● Installed
○ Removed



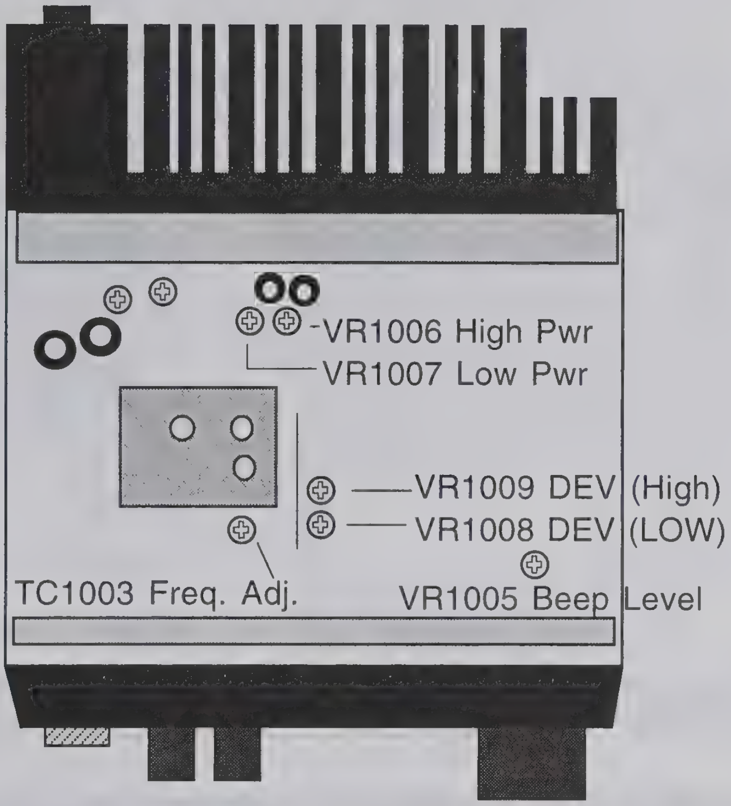
Modification Instructions

1. Unplug the power from the radio.
2. Open radio and located SW Unit. The SW unit is located on the front panel, behind the display.
3. Locate components D01, D03, R02 & R03 See drawing.
4. **Remove or Install the components per table 1.**
5. Reassemble the radio.

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
Unknown



Modification Instructions

1. Remove five screws from the top cover and remove the cover.
2. Remove five screws from the bottom cover and remove the cover.
3. Unplug the speaker.
4. Remove the four screws holding the front panel.
5. Locate jumper pad number 7.
6. **Solder bridge pad number 7.**
7. Locate the reset pins (Located on the front panel and clearly marked).
8. **Short the reset pins together for one second.**
9. Reassemble the radio.

YAESU FT-411E

Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

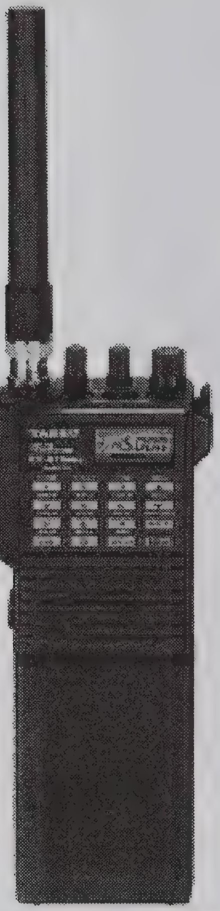
Expansion Range

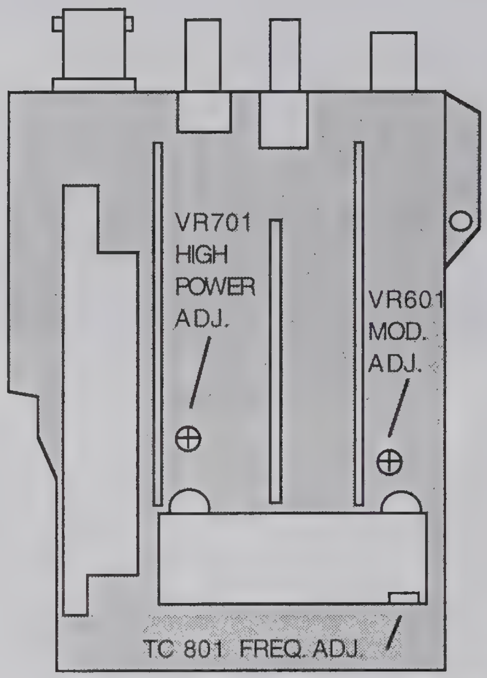
Not all versions will get full expansion

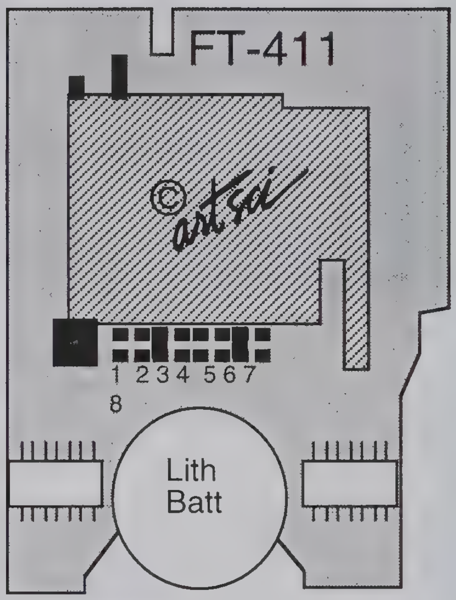
RX 120 MHz - 174 MHz
TX 140 MHz - 174 MHz

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.







Modification Instructions

1. Remove Battery and Antenna.
2. Remove control knobs, screws, top panel & body screws and open Radio
3. **Remove solder bridge from Pad # 2**
4. **Place solder Bridge on Pad # 3**
5. Reassemble Radio
6. **Reset Microprocessor.**
   (Press and hold [MR], [2] & [VFO] and turn radio on then off)
   (Press and hold both up and down keys and turn power on)
7. Enter the following: 1200 [VFO] 1740 [VFO] 1400 [VFO] 1740 [VFO]
8. Press [Function] & [7] to change channel step.

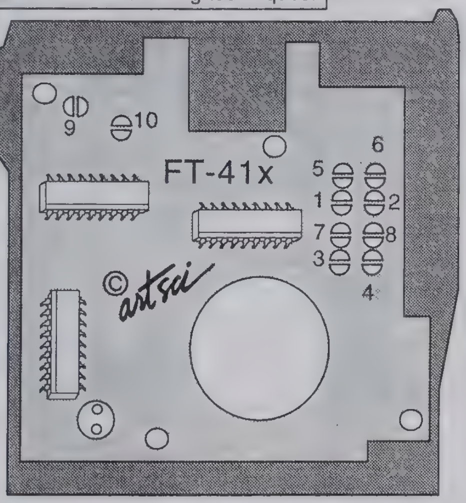
Receive and Transmit Expansion

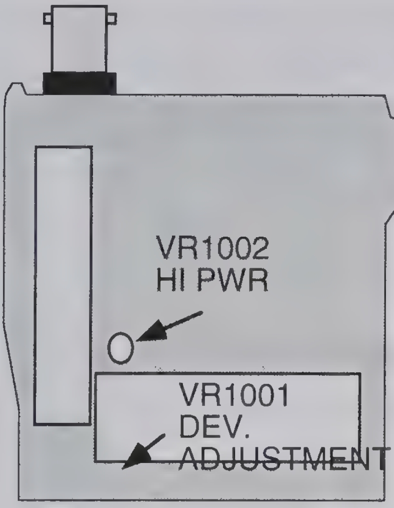
YAESU FT-415 FT-416

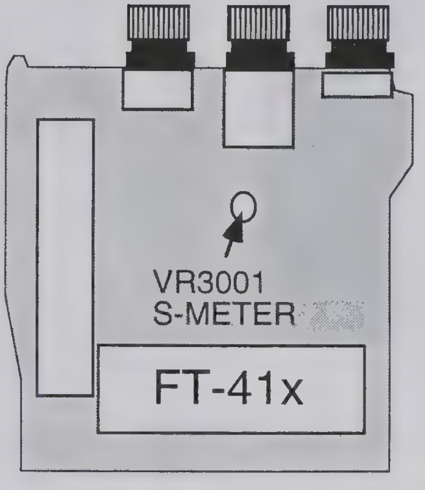
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
RX: 120 - 174 MHz
TX: 135 - 174 MHz







Modification Instructions

1. Remove Battery and Antenna.
2. Remove the four screws holding the battery track in place.
3. Remove the two black screws holding the rear case in place.
4. Carefully open the front cover from the radio.
5. Locate and **solder jumper pads 5 & 7.** Pads 3 and 9 are already jumpered.
   (Jumper pads 1 & 10 for 1750 Hz Tone Burst operation)
6. Carefully replace the front cover and replace the two black screws.
7. Replace the battery track and the four screws.
8. **Reset the microprocessor.**
   Press and hold [MR], [2] and [VFO] and turn the radio on.
9. The radio display will cycle orderly through the memory channels.
   Enter the following band limits:
10. Press [F] [7] and select 5 kHz channel spacing in each VFO.

Master Reset Command:
Press and hold [MR] & [2] & [VFO] and turn power on, then enter new limits

Ch. 1	Enter 120.00 and then press [VFO]	(Rx low limit)
Ch. 2	Enter 174.00 and then press [VFO]	(Rx high limit)
Ch.3	Enter 135.00 and then press [VFO]	(Tx low limit)
Ch.4	Enter 174.00 and then press [VFO]	(Tx high limit)

YAESU FT-470 Receive and Transmit Expansion

Expansion Range

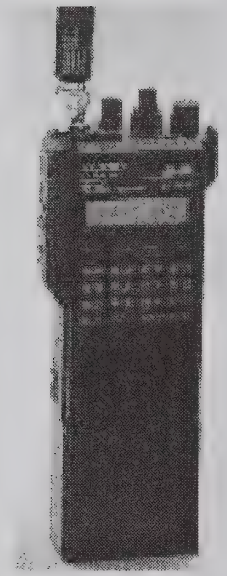
Not all versions will get full expansion

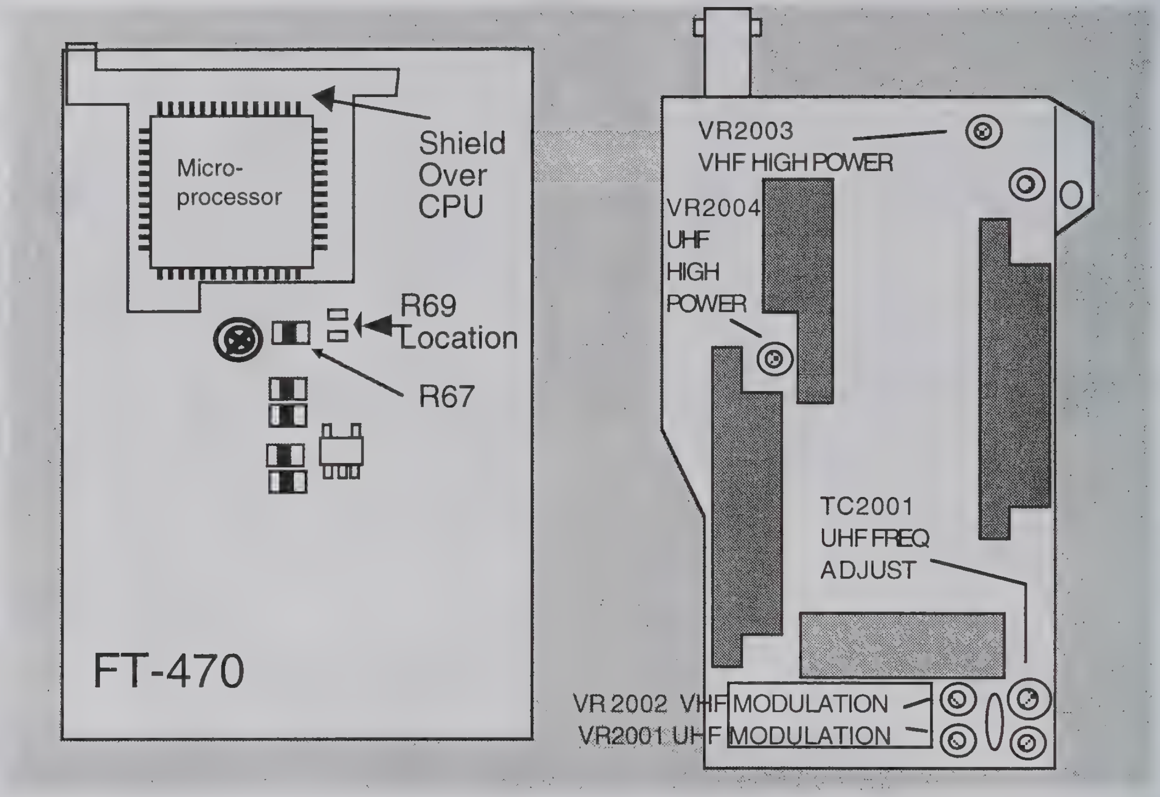
Unknown

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.





Modification Instructions

1. Remove Battery and Antenna.
2. Remove control knobs, screws, top panel & body screws and open Radio
3. Carefully unsolder the lithium battery and lift it to expose resistor position .
4. **Solder a Jumper or 0 ohm resistor(or** jumper) in the empty R69 position.
5. OPTIONAL- Crossband Half Duplex mod. Place a jumper wire from pin 4 & 14 of the flat cable wire connecting the front and back panels. This will use the ON AIR signal to mute the AUDIO CNTL line, muting the other band while transmitting.
6. Solder the lithium battery back in place.
7. Reassemble the radio.

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Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expanded RF (430 - 500 MHz RX)

The following procedure utilizes the "U" memory location to store the upper limit for the UHF reception. A high UHF frequency (ie 470 MHz) must always be stored in the "U" memory for the expanded UHF reception to work.

1. Program 450.00 MHz simplex.
2. Press [F/M] and then [RPT].
3. Enter 0000 into the keypad.
4. Turn the radio off and turn back on.
5. Press [RPT] twice for a + (plus) offset.
6. Press the [REV] button. (The display should now be 1450 MHz)
7. Press [Function] and then [Down Arrow] to drop the frequency down 1 MHz at a time until the display reads 500 MHz.
8. Press and hold the [F/M] key until your hear two beeps.
9. Rotate the dial knob until the "U" memory channel is displayed.
10. Press the [Function] key to store the frequency in memory.
11. Press [Function] and then [Down Arrow] to drop the frequency down 1 MHz at a time until the display reads 450 MHz.
12. Press and hold the [F/M] key until your hear two beeps.
13. Rotate the dial knob until the "L" memory channel is displayed.
14. Press the [Function] key to store the frequency in memory.

***** Stop here for 440 - 470 Coverage.**

15. Turn radio off and on and select the "U" memory channel.
16. Press [MR] and then [RPT]
17. Press the PTT button 3 times. The display should read 070.00 MHz
18. Press [Function] and then [Up Arrow] to increase the frequency up 1 MHz at a time until the display reads 400 MHz.
19. Press and hold the [Function] key until your hear two beeps.
20. Rotate the dial knob until the "L" memory channel is displayed.
21. Press the [Function] key to store the frequency in memory.

To receive a desired UHF frequency, you must use the following steps:

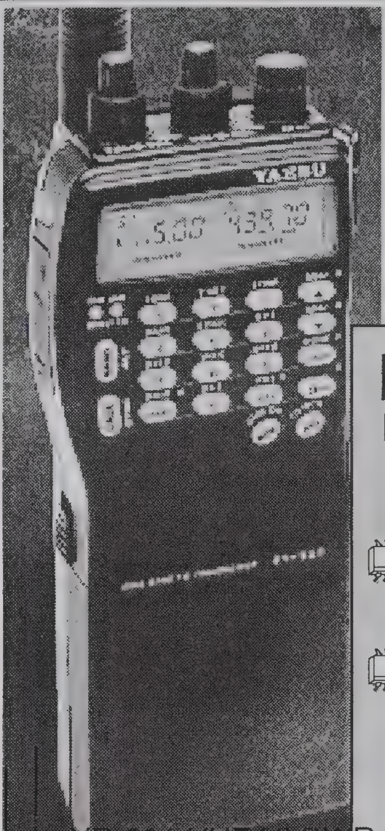
1. Select the "U" memory channel.
2. Press the [MR] key to enter the "MEMORY TUNE" mode.
3. Use the [arrow] keys or Dial Knob to select the desired frequency.
4. Store the selected in any memory channel, except memory channel "U" & L

Hyperscan Modification:

1. Select the "ALT mode by pressing [F] and [ALT]
2. Press the [UP] or [DOWN] arrow.
3. When the scan stops, Press [F] and then [VFO].
4. Press the [UP] or [DOWN] arrow. (HYPERSCAN MODE)
5. Press [F] and [ALT] to stop scan mode.

YAESU FT-530 Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.



After Lot 33

Jumper 12 = Tone burst

One report shows that Pad 15 may need to be removed for full expansion

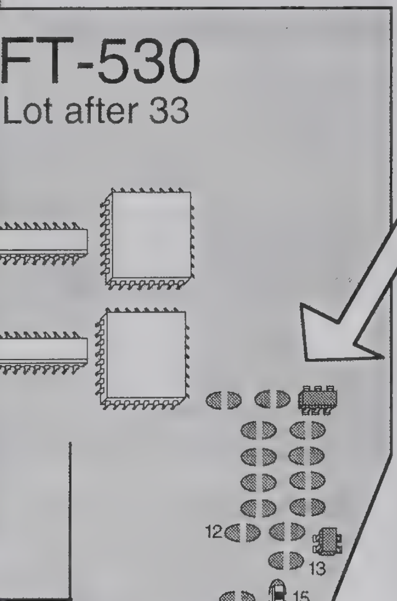
CAUTION:

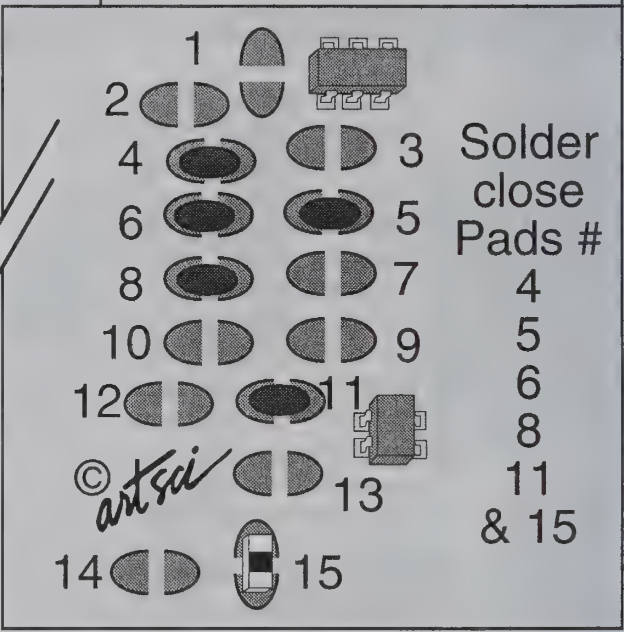
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

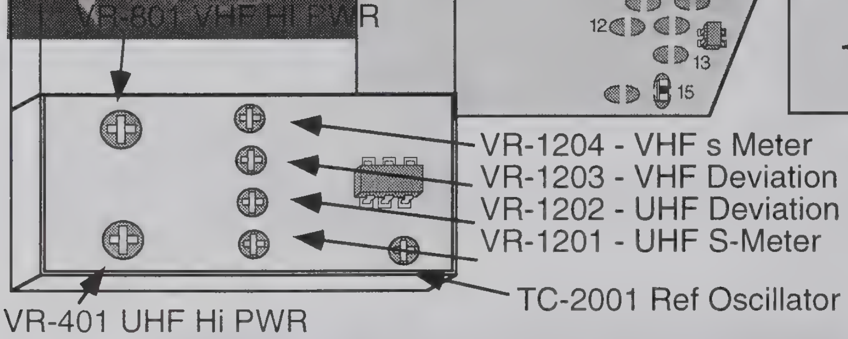
Expansion Range

Not all versions will get full expansion

RX: 110-177 MHz, 300-500 MHz
TX: 130-177 MHz, 400-470 MHz







Original Jumpers (O - Open, C- Closed)

1 - C
2 - O
3 - C
4 - O
5 - O
6 - C
7 - O
8 - C
9 - O
10 - O
11 - C
12 - O
13 - C
14 - O
15 - C

Modification Instructions

1. Remove battery and antenna.
2. Locate and remove the 4 screws on the bottom battery track.
3. Locate and remove the 4 black screws on the rear case.
4. Carefully open the front cover and open the radio.
5. Note location of white paper insulator and remove it. (Don't throw away)
6. **Locate jumpers and remove solder jumpers #1, 3 & 13(green wire).**
7. **Solder Jump Pads #4 & 5.**
   (Pads #4, 5, 6,8,11 & 15 are now solded.
8. Replace the paper insulator making sure the ground tabs slide through insulator
9. Close radio being careful not to pinch any wires.
10. Replace all screws.
11. Replace battery and antenna.
12. **Press and hold both [MR] & [VFO] arrow buttons and turn power on.**

Early Model

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

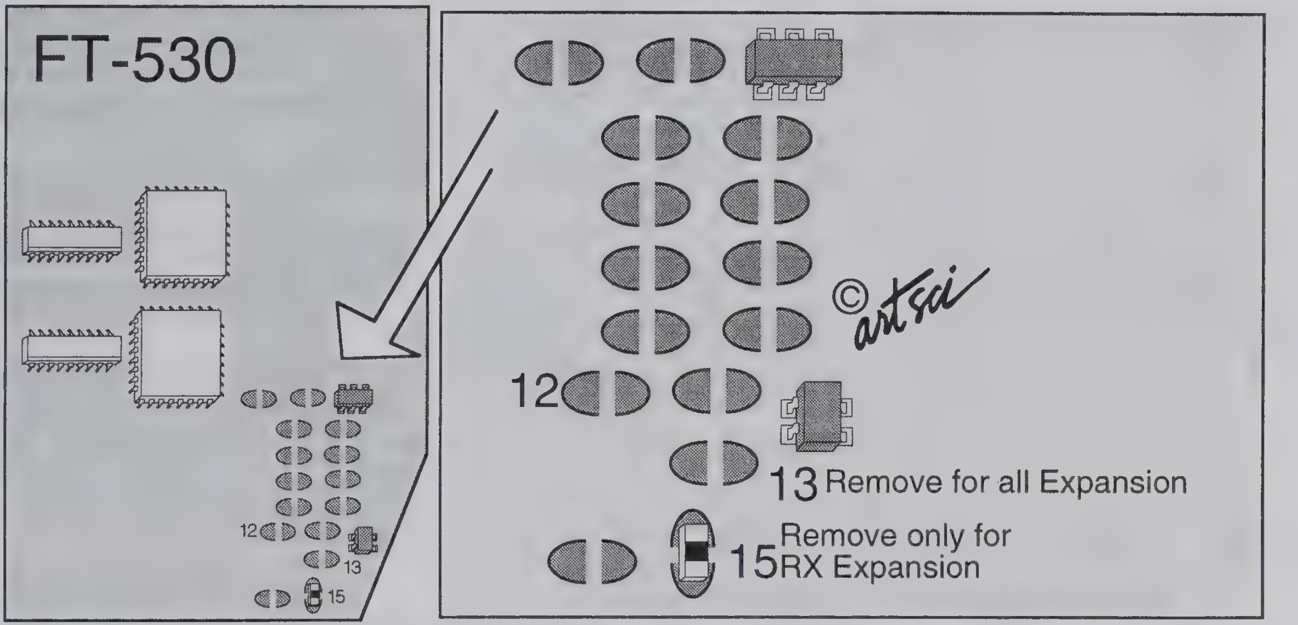
Expansion Range

Not all versions will get full expansion

RX: 110-180 MHz, 300-500 MHz
TX: 130-177 MHz, 400-470 MHz

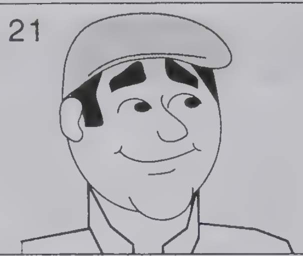
TONE BURST -
Jumper Pad # 12.
Stock Pads Soldered: 1, 3, 6, 8, 11, 13, 15

RX ABOVE 500 MHz:
Put 300 in lower limit & 950 in upper limit.
Press [MR] [MR]. (a line will appear on the display below "L")
Enter in desired FREQ.



Modification Instructions

1. Remove battery and antenna.
2. Locate and remove the 4 screws on the bottom battery track.
3. Locate and remove the 4 black screws on the rear case.
4. Carefully open the front cover and open the radio.
5. Note location of white paper insulator and remove it. (Don't throw away)
6. **Locate jumpers location J13 and remove solder jumper.**
   DO NOT DO BOTH JUMPER pads 13 & 15.
7. Replace the paper insulator making sure the ground tabs slide through insulator
8. Close radio being careful not to pinch any wires.
9. Replace all screws.
10. Replace battery and antenna.
11. Press and hold both [MR] & [VFO] arrow buttons and turn power on..



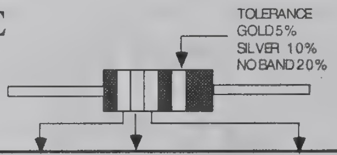
BOB Simpleton's Guide to Color codes

As seen in the ***Amateur Radio Trader***

The electronic industry created a standard for color coding parts many, many years ago. The same color code is used on all different types of components. With a little effort, and a good memory, the basic color code can be memorized. In color code sequence is: BLACK, BROWN, RED, ORANGE, YELLOW, GREEN, BLUE, VIOLET, GRAY and WHITE. The number sequence that corresponses with the color code starts with zero; Black=0, Brown=1, Red=2, etc.

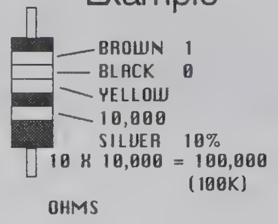
Components using color stripes and surface mount components use the 'significant' digit system paired with a multiplier digit, based on the powers of ten. An additional color stripe is also used to determine the accuracy or tolerance of the component. Higher accuracy components requires more significant digits to accurately describe the value. 5% accuracy parts use two 2 significent digits colors stripes followed by the multliper color stripe. 2% and 1% components often use 3 significent digit colors stripes .

RESISTOR COLOR CODE



COLOR	1st DIGIT	2nd DIGIT	MULTIPLY BY
BLACK	0	0	1
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
VIOLET	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	1,000,000,00
GOLD			0
SILVER			.1
			.01

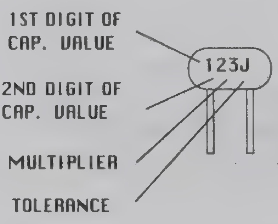
Example



Resistor standard values (significant digits)

10	brown	black	33	orange	orange
11	brown	brown	36	orange	blue
12	brown	red	39	orange	white
13	brown	orange	43	yellow	orange
15	brown	green	47	yellow	purple
16	brown	blue	51	green	brown
18	brown	gray	56	green	blue
20	red	black	62	blue	red
22	red	red	68	blue	gray
24	red	yellow	75	purple	green
27	red	purple	82	gray	red
30	orange	black	91	white	brown

CAPACITORS



MULTIPLIER		TOLERANCE		
	MULTIPLY BY		10pF or less	over 10pF
0	1	B	0.1pF	
1	10	C	0.25pF	
2	100	D	0.5pF	
3	1,000	F	1.0pf	1%
4	10,000	G	2.0pf	2%
5	100,000	H		3%
		J		5%
8	.01	K		10%
9	0.1	M		20%

Most common resistors are in the 5 to 10% tolerance range. Silver is used for 10% and gold is used for 5%. 20% resistors have no tolerance color bar.

One very common resistor is color coded: red red orange gold. Take a moment and see if you can use the attached resistor table and calculate the value..

If you calculated a 22,000, 5% resistor, you are correct. It is calculated like this: $22 \times 10^3 = 22{,}000$. What possible readings would you expect if you connected this resistor to an ohm meter?

Since it is a 5% tolerance resistor, the measured value will be between 19.800 and 24,200 ohms. That is calculated be allow 5% above and below the stated value.

Surface mount resistors do not use color stripes. The 2 significent digits and multiplier digit are printed right on the top of the component. These components are very, very small. The printed digits are often so small, you may need a magnifying glass to read them.

A surface mount resistor marked 103 would be a 10,000 ohm resistor (10k ohms). For everyone interested in mathematics, the formula is $10 \times 10^3 = 10{,}000$

A little practice will make reading resistors and other electronic componets easy as pi. 73, Bob

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Performance Report

Radio ____________________ Date __________

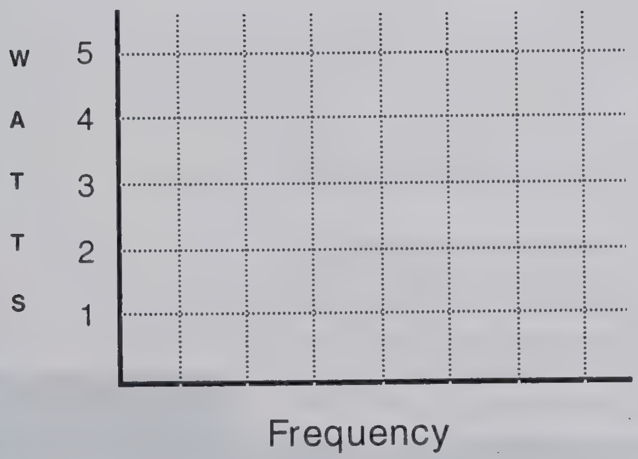
Owner : Name ____________________

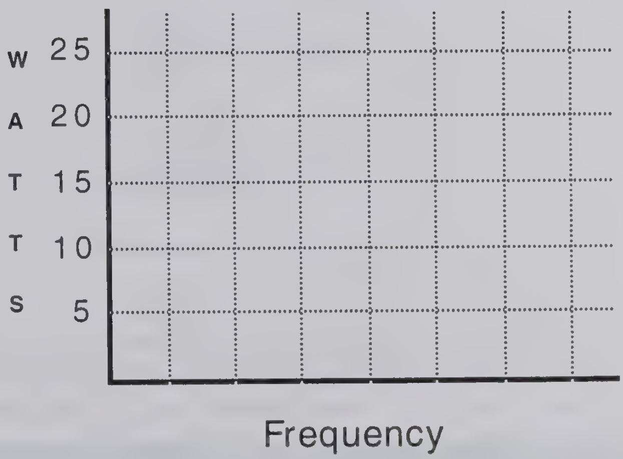
Address ____________________

City ______________ St. ______ Zip __________

Phone (   )   -

Description	Before	After
Power out (Low)	______ Watts	______ Watts
Power out (High)	______ Watts	______ Watts
Frequency Error (Simplex)	______ Hz	______ Hz
Frequency Error (Offset)	______ Hz	______ Hz
Receive Sensitivity (Mid-band)	______ uv	______ uv
Receive Sensitivity (____MHz)	______ uv	______ uv
Receive Sensitivity (____MHz)	______ uv	______ uv
PL Deviation	______ Hz	______ Hz
DTMF Deviation	______ KHz	______ KHz
Audio Deviation	______ KHz	______ KHz
Lowest usable Freq @ .5 Pwr	______ MHz	______ MHz
Highest usable Freq @ .5 Pwr	______ MHz	______ MHz





YAESU FT-650 Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

25 - 56 MHz

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Modification Instructions

1. Turn the radio off.
2. Press and hold [VFO] & [MR] and turn on the radio.

Repeat the step above to return to Normal settings

Receive and Transmit Expansion

YAESU FT-709

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

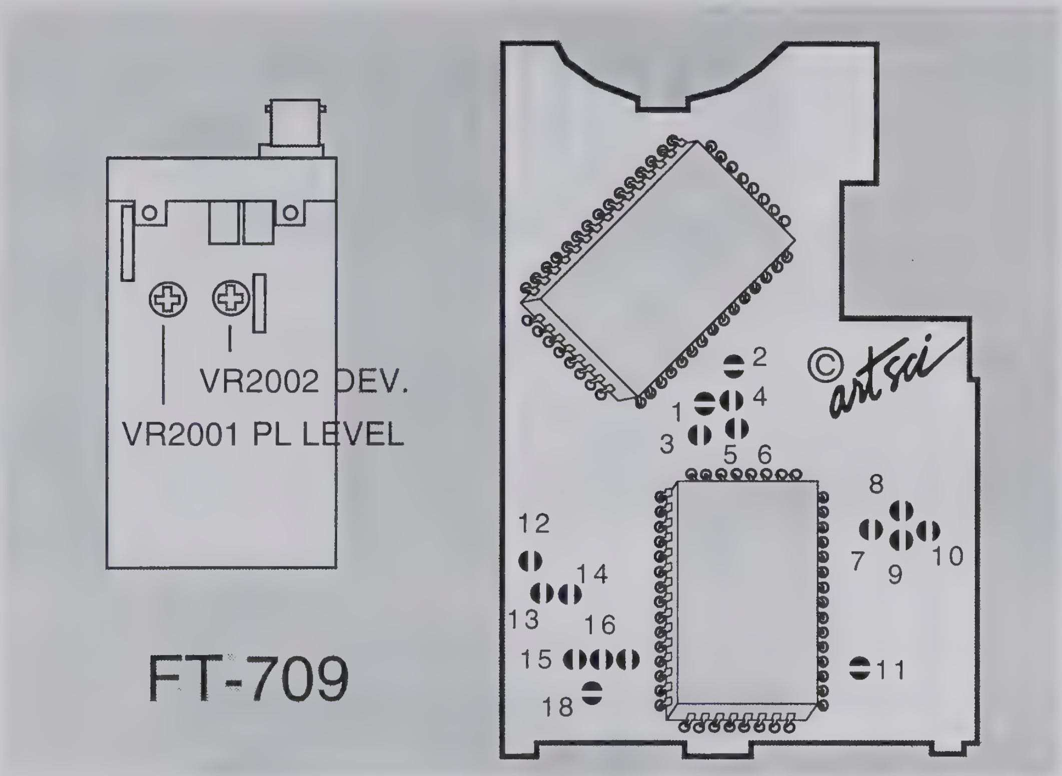
CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

Unknown



Modification Instructions

1. Remove battery and antenna.
2. Remove battery screws, belt clip screws and side strap screws.
3. Remove black trim on sides of the radio.
4. Remove the two side screws and slide the u-shaped back cover off.
5. Remove the four tiny Phillips screws holding the front panel on.
6. The ground jumper on the left side needs to be unsoldered.
7. Fold panel to the right to open the radio

Untested out of band mod #1: **Jumper pads 1,7,9,10, 13 & 16.**
Untested out of band mod #2: **Jumper pads 7,9,10,1, 13 & 16.**

8. Locate alignment pots. Make adjustments.
9. Reassemble the radio.
10. Reset the microprocessor. (If desired)
11. On FT-709 enter 4400 [D], 4490 [D], 4400 [D], 4490 [D]. 5000 [SHIFT]
    Note: RX range of 440.0 - 449.0 MHz and TX range of 440.0 - 449.0 MHz

Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

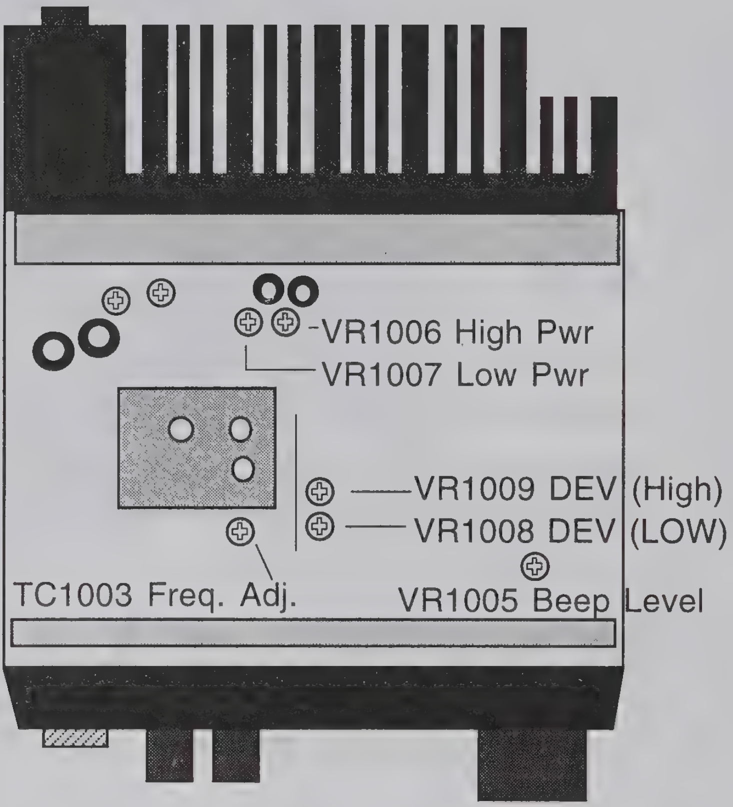
Expansion Range

Not all versions will get full expansion

Unknown

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Modification Instructions

1. Remove five screws from the top cover and remove the cover.
2. Remove five screws from the bottom cover and remove the cover.
3. Unplug the speaker.
4. Remove the four screws holding the front panel.
5. Locate jumper pad number 7.
6. **Solder bridge pad number 7.**
7. Locate the reset pins (Located on the front panel and clearly marked).
8. Short the reset pins together for one second.
9. Reassemble the radio.

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Receive and Transmit Expansion

YAESU FT-712RH

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

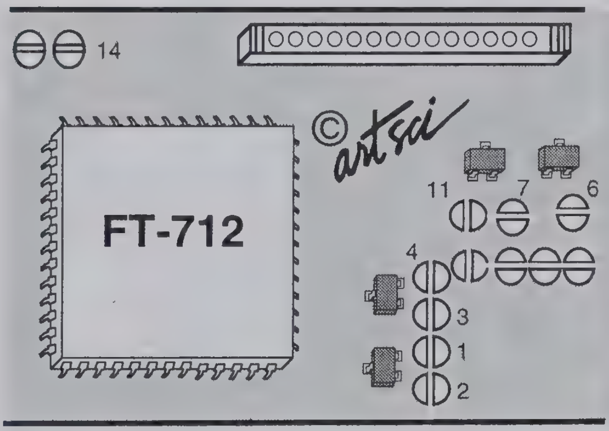
CAUTION:

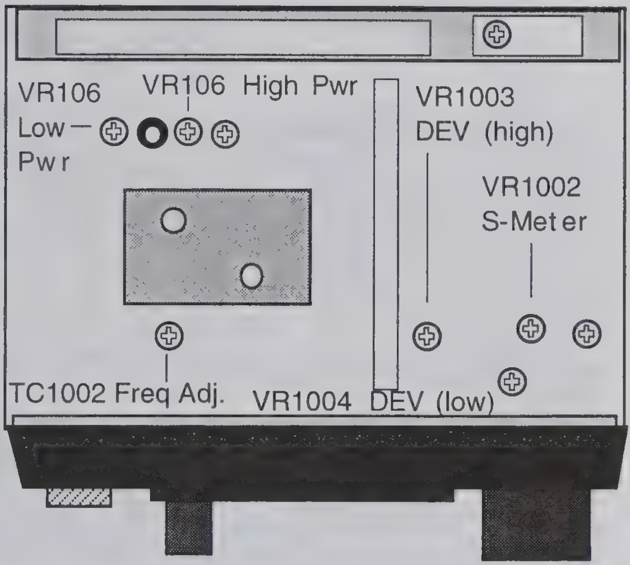
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

430 - 465 MHz





Modification Instructions

1. Unplug the DC power cable from the radio.
2. Remove the top and bottom covers.
3. Remove the speaker.
4. Remove the knobs and nuts from the front panel.
5. Remove the three screws from the control unit.
6. Remove the Control unit from the front panel.
7. **Remove solder from pad #1 and Pad #2 on control unit.**
8. **Solder jumper Pads 4 and 14.** Pads 3,4,5,7,11 and 14 will be bridged
9. Replace the control unit on the front panel.
10. **Reset the microprocessor.** (using a jumper short D09 on the control unit to ground on the radio. Do not apply power).
11. Apply DC power and turn radio on.
12. Press [MR] & use the control knob to enter 430 and press [D/MR]. (lower limit)
13. Press [MR] and use knob to enter 501 and press [D/MR]. (upper limit)
14. Press [F] and then [RPT] button. use the control knob to enter 5.000. Press the [RPT] button.

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

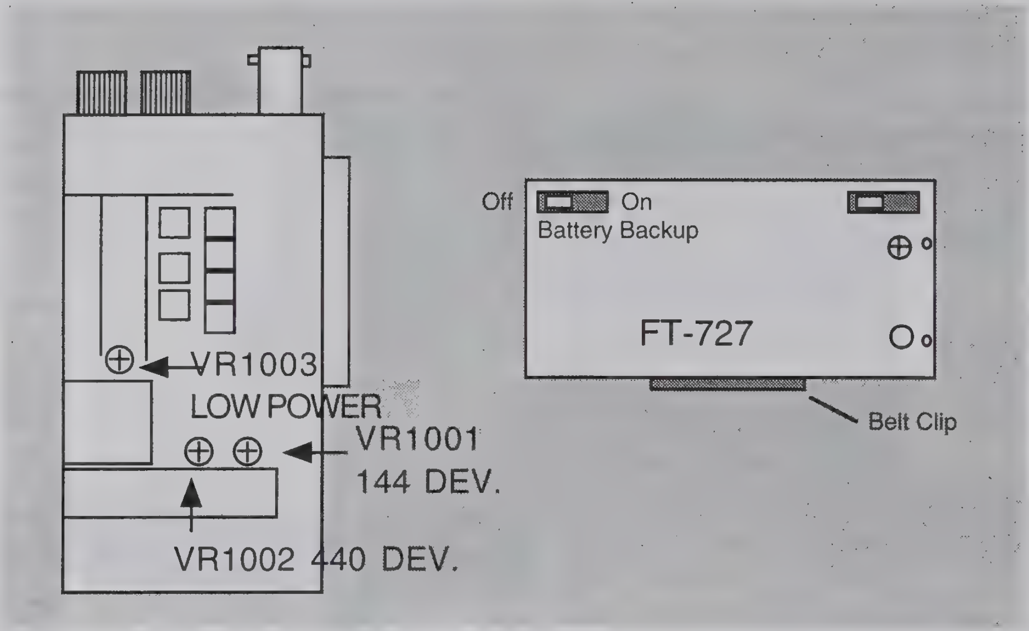
Expansion Range

Not all versions will get full expansion

Unknown

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Modification Instructions

1. Remove Battery
2. Turn off the Battery backup switch. (located on the bottom of the radio)
3. Wait 10 Seconds and Turn the switch back on
4. Replace battery
5. Turn Radio ON. (Display should go blank, if not redo steps 1-4)
6. Enter the following: 001111 (note: factory setting is 443300)
7. Reset the VHF & UHF offsets.
   Select VHF then Press [F] then the [Shift] button.
   Enter 0600 then [D]
   Select UHF then Press [F] then the [Shift] button.
   Enter 5000 then [D]

PLL Alignment

1. Remove battery, and belt clip
2. Remove battery track screws
3. Remove rear cover
4. Install the battery track.
5. Turn radio on & enter desired frequency
6. Adjust L01 (black slug) in VCO unit until the on air lamp is lit (red light) (L01 core, turn counter-clock wise)
7. Reassemble the radio.

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Receive and Transmit Expansion

YAESU FT-736R

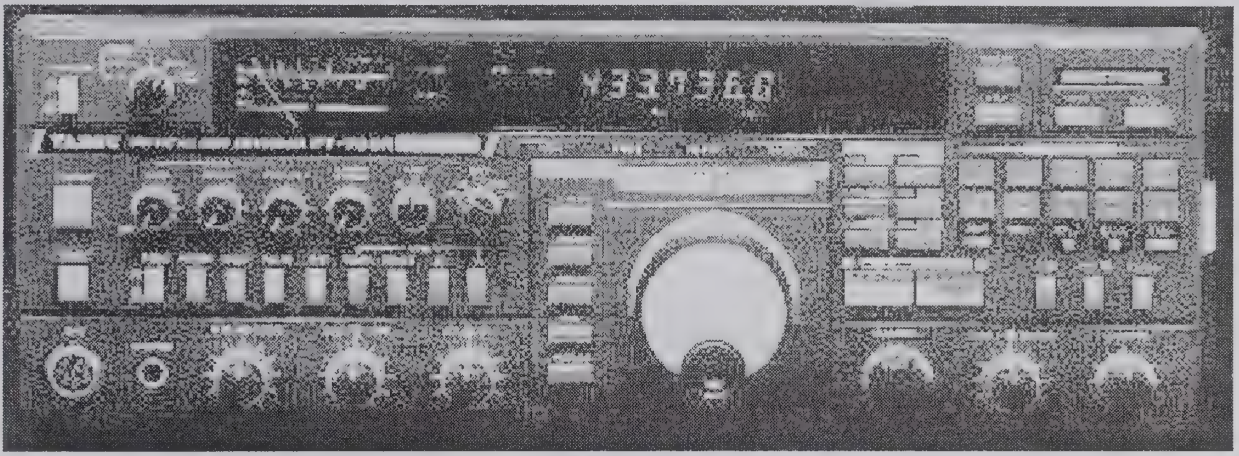
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
See Chart

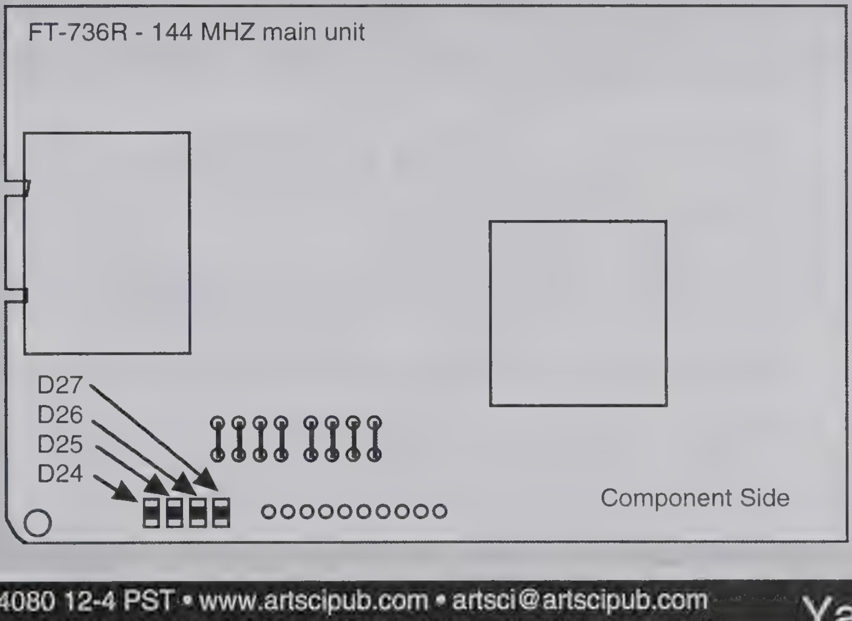
Modification Instructions

1. Unplug the power from the radio.
2. Open the radio and locate the 144 MHz main unit.
3. Locate diodes D24, D25, D26 and D27 See drawing.
4. **Remove or Install the diodes per table 1.**
5. Reassemble radio.



D24	D25	D26	D27	
○	●	●	○	144.0 - 148.0 MHz
○	●	●	●	141.0 - 154.0 MHz
○	○	●	●	144.0 - 146.0 MHz

● Installed
○ Removed



Receive and Transmit Expansion

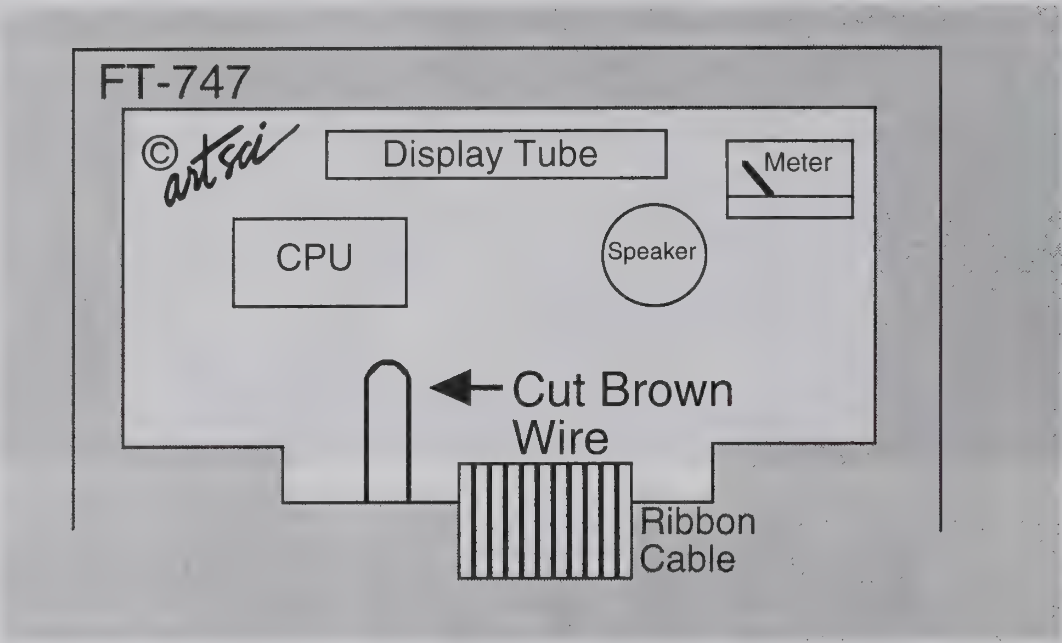
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

.5 - 30 MHz



Modification Instructions

1. Unplug the DC power cable from the radio
2. Remove the top cover (see instruction manual page 23)
3. **Remove or cut the BROWN jumper wire** on the display unit. See Drawing
4. Reconnect the power cable and turn the radio on
5. Set the VFO dial to 12.3456 MHz
6. Turn power off and then back on again.
7. Turn power off and reassemble radio. (don't pinch any wires)

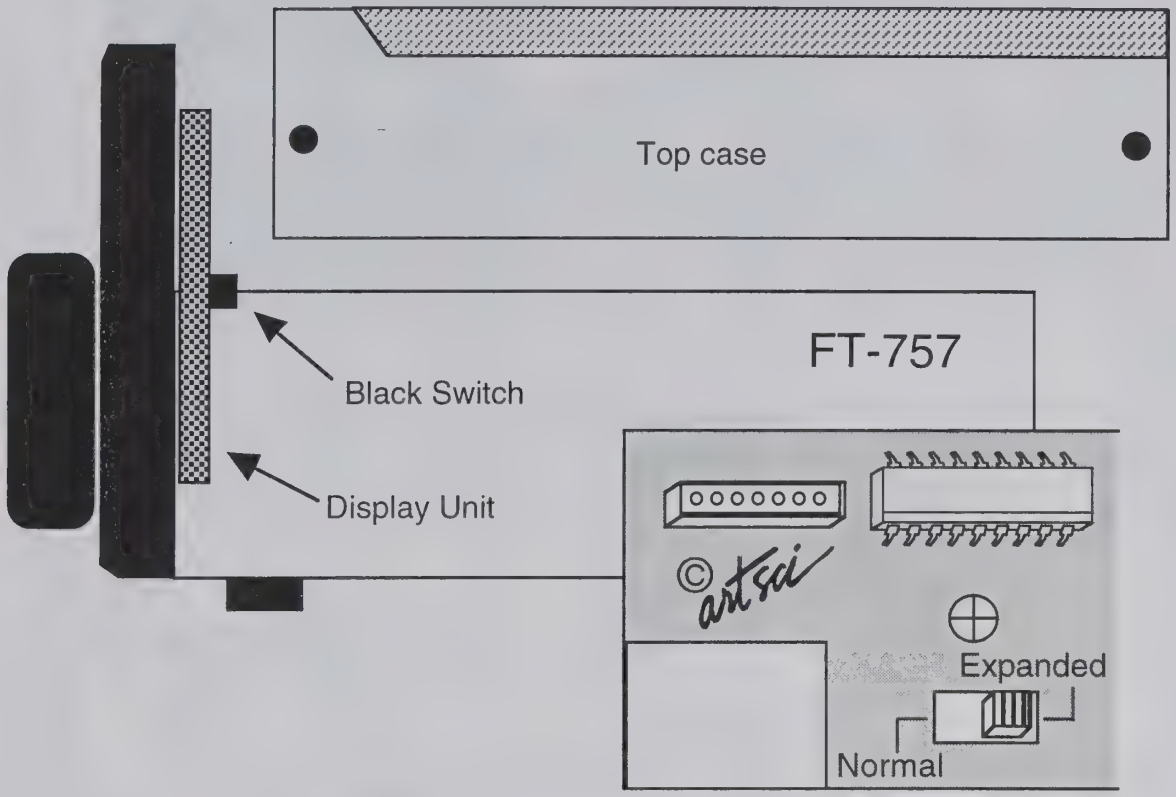
Receive and Transmit Expansion

YAESU FT-757GX FT-757GXII

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
Unknown



Modification Instructions

1. Unplug the DC power cable from the radio.
2. Remove the top cover. You may need to remove the speaker wire to remove the top cover. (see service manual for cover removal)
3. Locate the Black slide switch on the display panel. (to the right of center and halfway down the backside.
4. Use a screwdriver to **set the switch to the left most position.**
5. Reassemble the radio.

Some models outside the USA may need the following modification -

1. Isolate pin 19 of IC-67(MC68HC05C) on both side of circuit board.
2. Link pin 19 to pin 16 of IC-66(MC14510) with a 10 resistor.
   Be sure to use resistor leads are insulated to prevent shorts.

YAESU FT-767GX Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

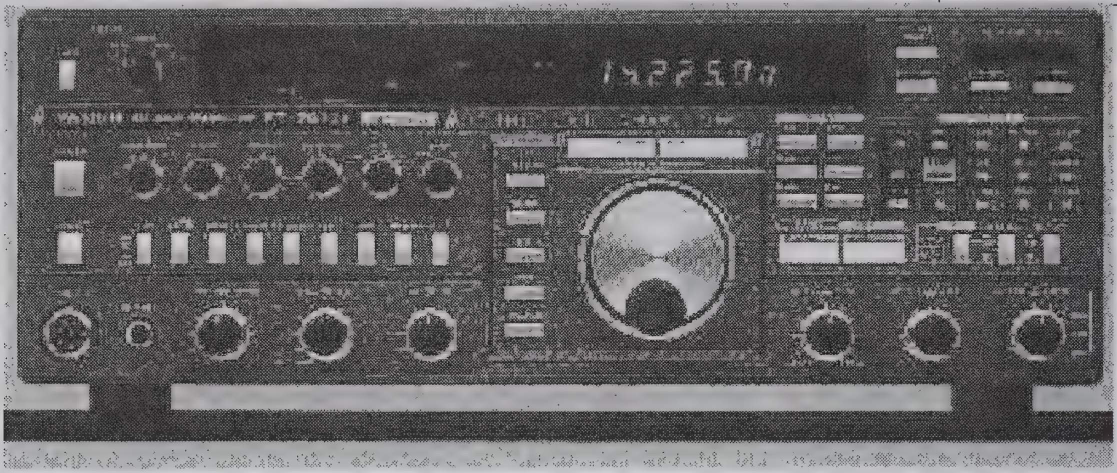
Expansion Range

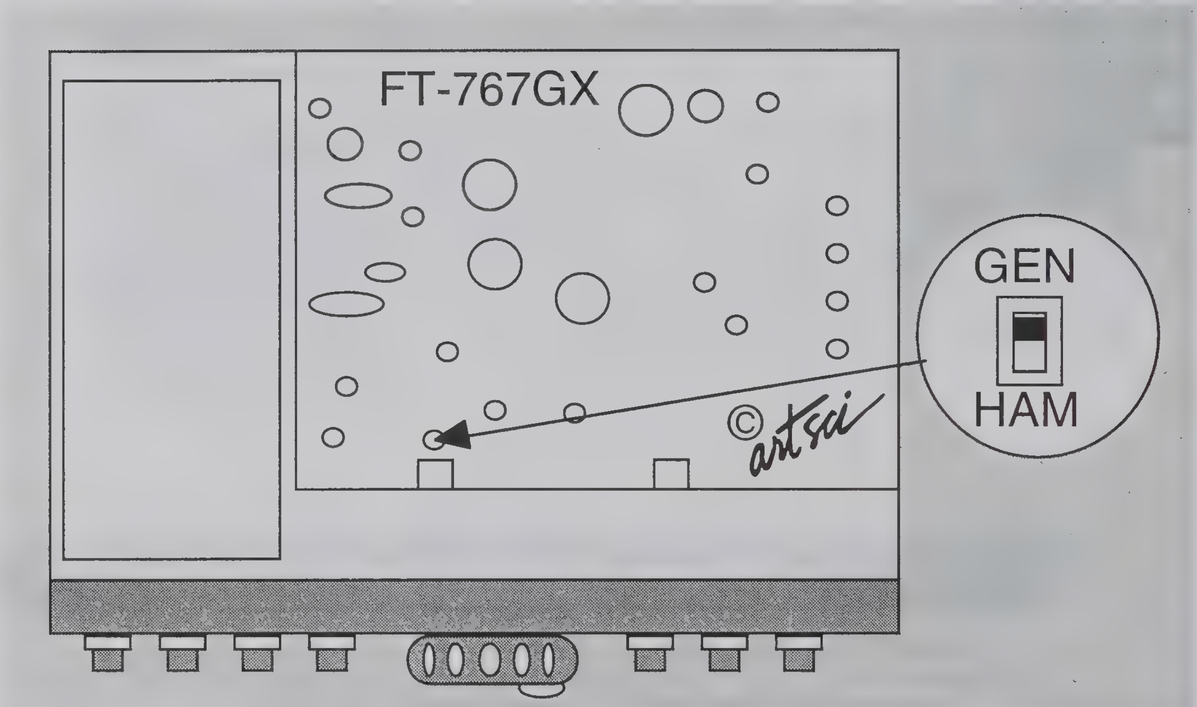
Not all versions will get full expansion

Unknown

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.





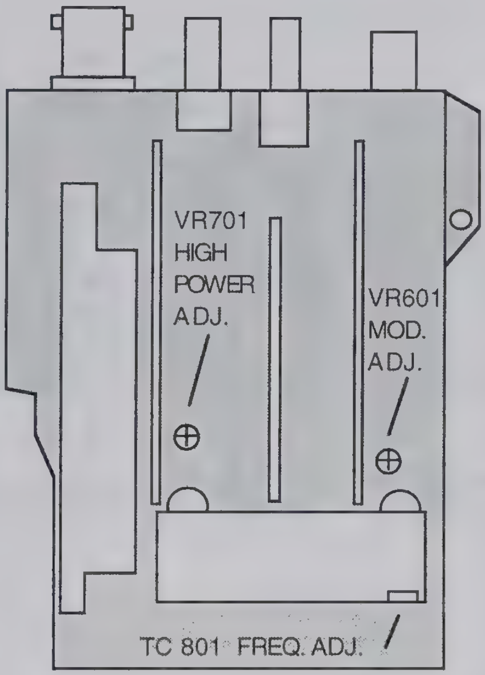
Modification Instructions

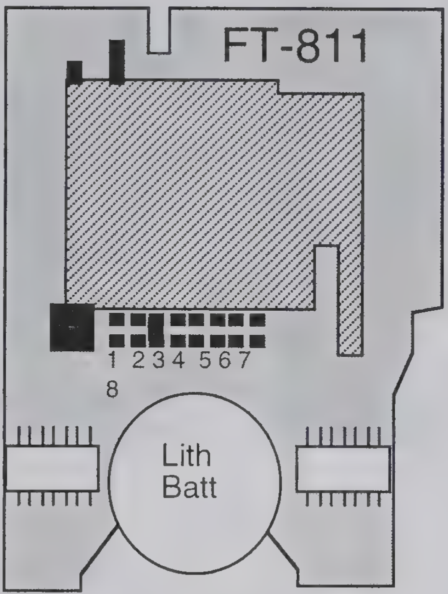
1. Unplug the DC power cable from the radio.
2. Remove any VHF or UHF Band modules.
3. Remove two screws at the front of the top cover and remove the top cover .
4. Locate the GEN/HAM switch inside the shield cover.
5. **Use a screwdriver to set the switch to the GEN position.**
6. Reassemble the radio.

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

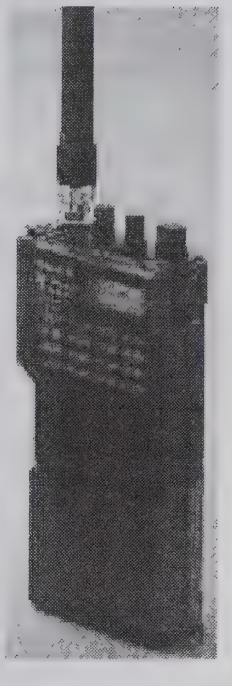
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
RX 410 MHz - 475 MHz
TX 410 MHz - 475 MHz





Pads 2 & 4 OPEN
Pad 3 Closed(soldered)



Modification Instructions

1. Remove Battery and Antenna.
2. Remove control knobs, screws, top panel & body screws and open Radio
3. **Remove solder bridge from Pad # 2**
4. **Remove solder bridge from Pad # 4**
4. **Place solder Bridge on Pad # 3**
5. Reassemble the radio
6. **Reset microprocessor.** (Press and hold [MR] & [VFO] and turn radio on then off)
(Press and hold both up and down keys and turn power on)
7. Enter the following: 4100 [VFO] 4750 [VFO] 4100 [VFO] 4750 [VFO]
8. Press [Function] & [7] to change channel step.
9. Press [F] & [RPT] and enter offset in both VFO. (5.00 MHz is standard)

YAESU FT-815
FT-816

Receive and Transmit Expansion

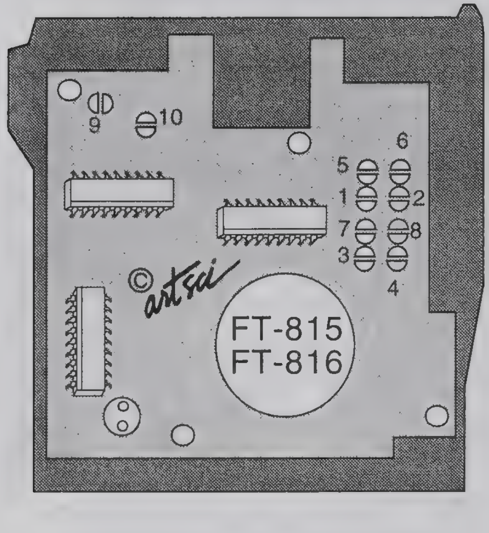
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

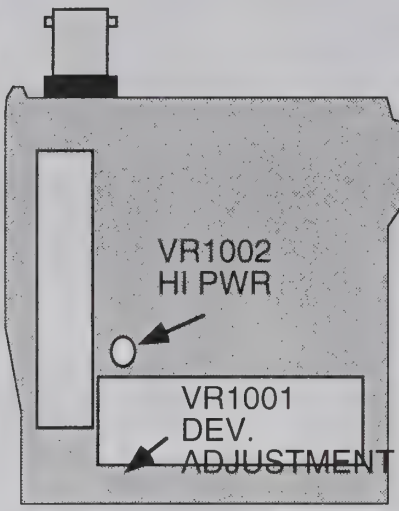
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

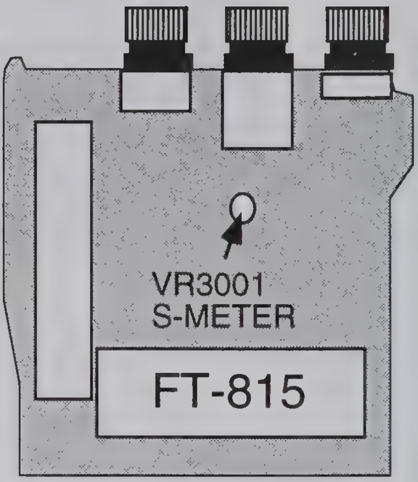
Expansion Range

Not all versions will get full expansion

410 - 475 MHz RX
415 - 470 MHz TX







Modification Instructions

1. Remove Battery and Antenna.
2. Remove the four screws holding the battery track in place.
3. Remove the two black screws holding the rear case in place.
4. Carefully open the front cover from the radio.
5. Locate and **remove the solder from jumper pad #8.**
6. **Locate and solder jumper pads 5 & 7.** Pad 9 is already jumpered.
7. Carefully replace the front cover and replace the two black screws.
8. Replace the battery track and the four screws.
9. Reset the microprocessor.
10. **Press and hold [MR], [2] and [VFO] and turn the radio on.**
11. The radio display will cycle orderly through the memory channels.
    Enter the following band limits:

    Ch. 1 Enter 410.00 and then press [VFO] (Rx low limit)
    Ch. 2 Enter 475.00 and then press [VFO] (Rx high limit)
    Ch. 3 Enter 415.00 and then press [VFO] (Tx low limit)
    Ch. 4 Enter 470.00 and then press [VFO] (Tx high limit)

16. Press [F] [0] & [6] and select 5.000 MHz channel spacing in each VFO.

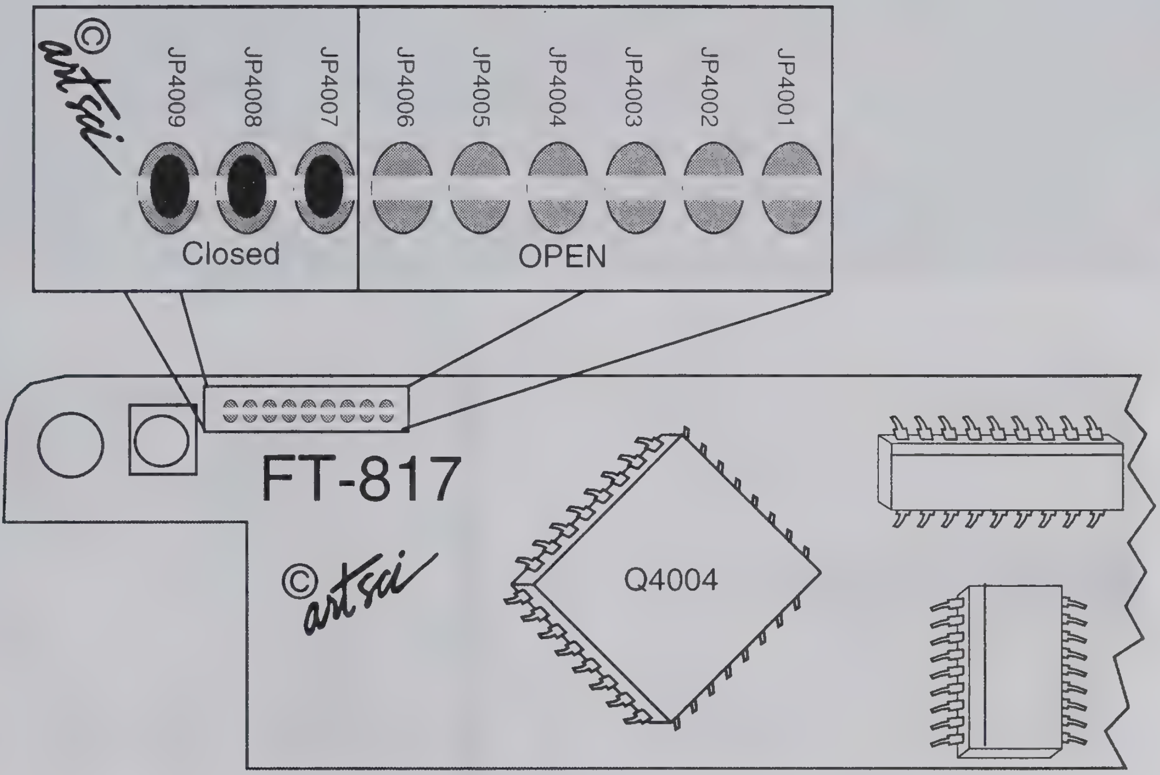
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

RX/TX 50 / 54 MHz, 140 - 154 MHz, 420 - 470 MHz



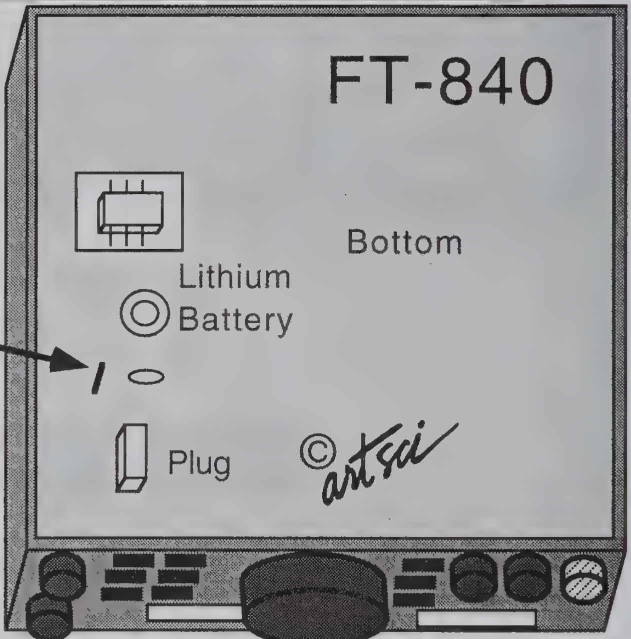
Modification Instructions

1. Remove power and antenna
2. Remove 14 screws holding top and bottom covers
3. Remove Battery cover latch
4. Remove covers
5. Carefully lift 4 plastic tabs holding the front panel.
   Gently move front panel forward.
6. Disconnect ribbon cable connecting front panel to chassis.
7. Solder connect jumpers JP4007, 4008 and 4009
8. Make sure pads 4001 through 4006 are open
9. Reassemble the radio
10. Press and hold [VFO/MR] anf [F] and turn radio on.

YAESU FT-840 Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Expansion Range
Not all versions will get full expansion
1.8 - 30 MHz

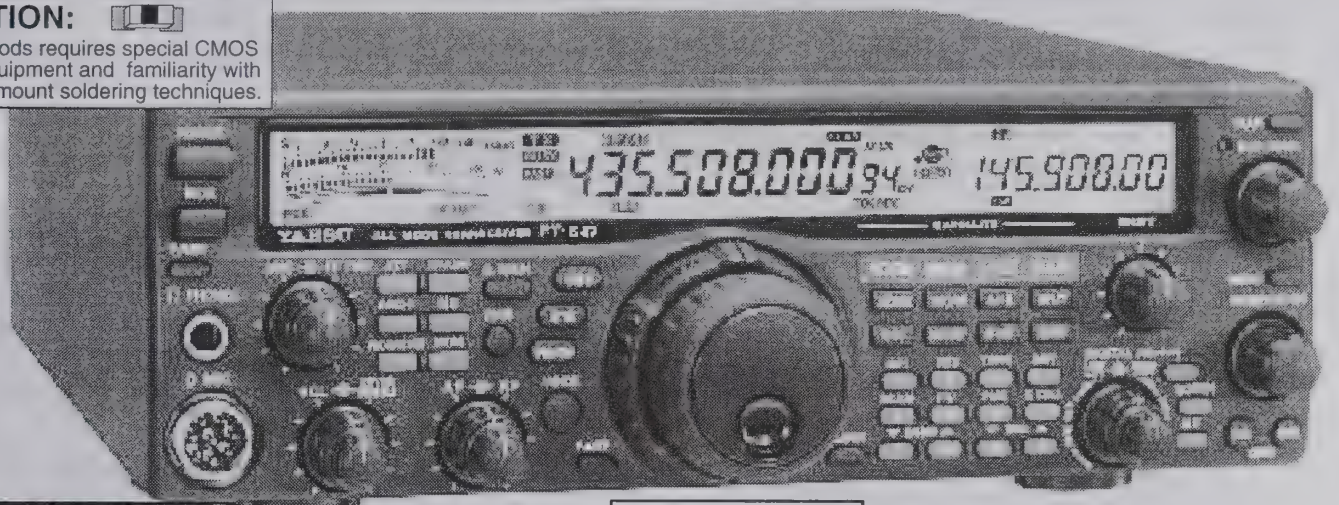
Modification Instructions

1. Remove antenna from the radio.
2. Remove top and bottom covers.
3. On Local Unit, **TEMPORARILY jump TP-2003 to ground**.
   (Take a wire clip lead and attach it to the metal case)
4. Press and Hold [SSB] & [AM] & turn power on. (display will show 02-OFF)
5. Rotate main control knob to show 02-ON.
6. Press [AM]. The display should show (7.000.00 LSB)
7. Turn the radio off.
8. Press and hold the memory [DOWN] & [UP] buttons and turn the radio on.
9. Turn the radio off.
10. Remove the Jumper to ground on TP-2003
11. Reassemble the radio.

Receive and Transmit Expansion

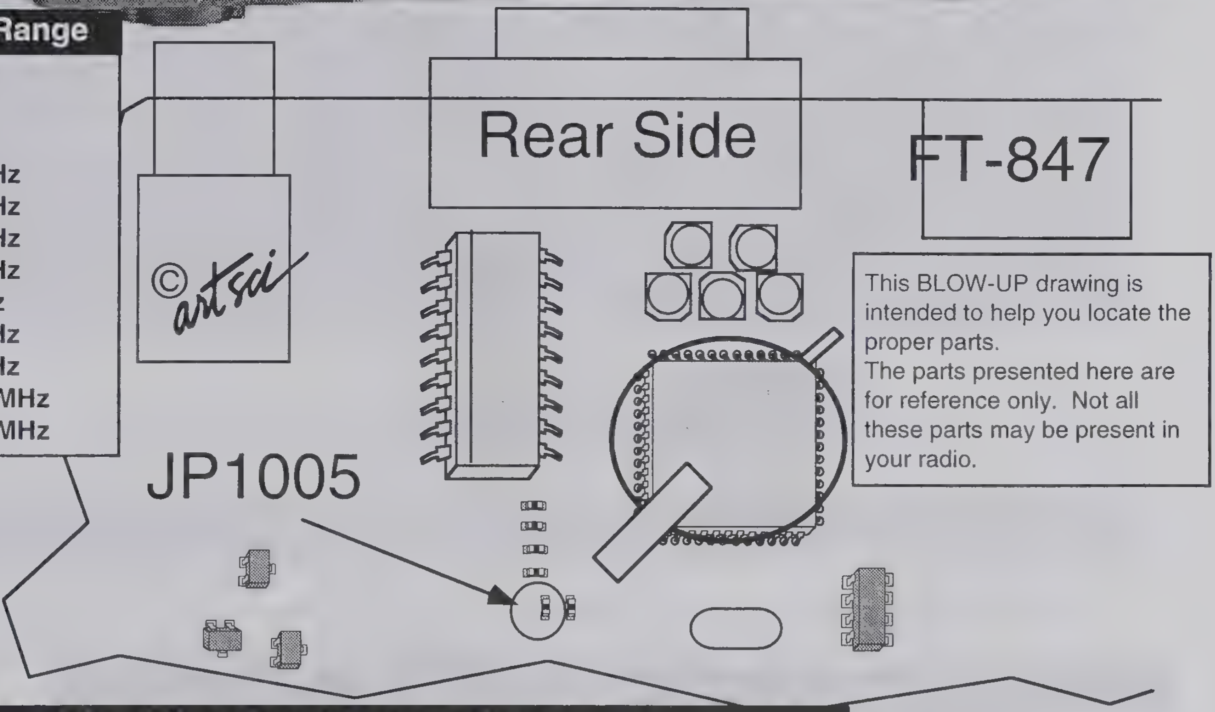
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Expansion Range

- 1.8 - 1.99 MHz
- 3.5 - 3.99 MHz
- 7.0 - 7.49 MHz
- 10.0 - 10.49 MHz
- 14.0 - 14.49 MHz
- 18.0 - 18.49 MHz
- 21.0 - 21.49 MHz
- 24.5 - 24.9 MHz
- 28.0 - 29.99 MHz
- 50.0 - 53.99 MHz
- 140.0 - 153.99 MHz
- 420.0 - 459.99 MHz



This BLOW-UP drawing is intended to help you locate the proper parts.
The parts presented here are for reference only. Not all these parts may be present in your radio.

Modification Instructions

1. Remove power and antenna from the radio.
2. Remove top and bottom covers.
3. Locate and **remove Resistor from JP1005 & JP1006** on AF-CNTL unit (it is located near Q1105, X1004 and Q1100.)
4. Locate and **Solder Bridge JP1002 & JP1003**
4. Press and hold [LOCK] & [FAST] button and turn the radio on.
5. Release the buttons and turn the radio off.
6. Reassemble the radio.

After modification the auto repeater shift will be lost

Not all versions will get full expansion

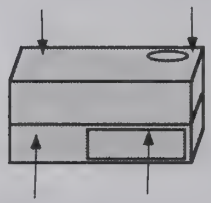
YAESU FT-890

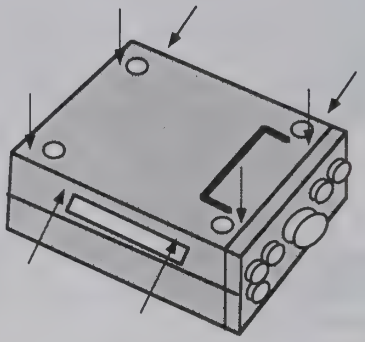
Receive and Transmit Expansion

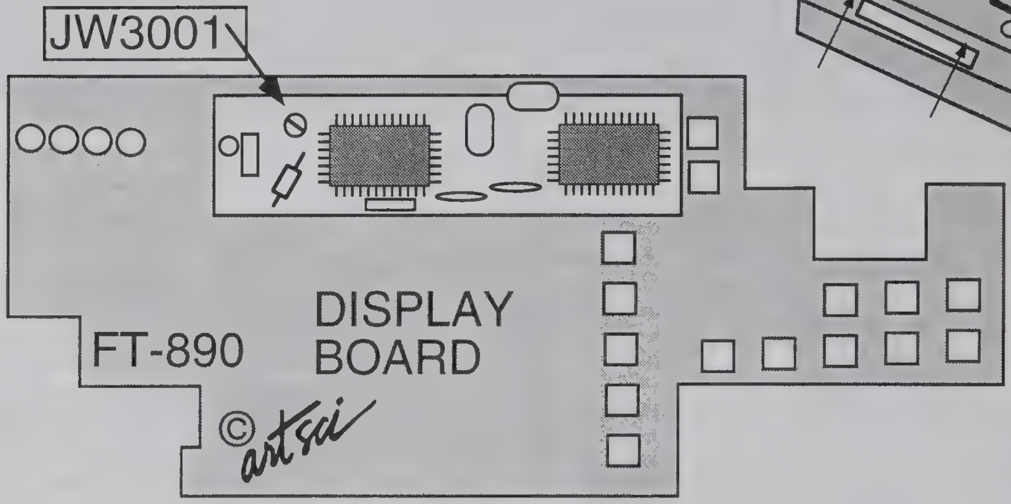
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
1.8 - 29.99 MHz







Modification Instructions

1. Remove power from the radio.
2. Remove covers.

The next step is done TEMPORARILY.

3. **Locate jumper location JW3001 on the DISPLAY UNIT and solder bridge the pads.**
4. Reconnect the power cable.
5. **Press and hold [PROC], [AGC-F], [IPO] & [ATT] and turn the power on.**
6. **Rotate the main dial until the display shows 02-ON .**
7. **Press [PROC].** This will confirm and write the data to EEPROM memory.
8. Turn the power off and remove the power cords.
9. Remove the jumper placed in step 3 above.
10. Replace the covers.

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Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
1.8 9 29.99 MHz

Modification Instructions

1. Remove power from the radio.
2. Remove the two screws on the top cover and the two on the top rear area of the rear panel.
3. Slide the top cover/heat sink towards the rear, to expose the CNTL-1 unit.
   (The CNTL unit is the inside part of the front panel.)
4. Locate test points TP3001 & TP3002 on the CNTL unit.
   (They are located on the top/center of the CNTL board)
5. **Connect a jumper between TP3001 & TP3002.** An alligator clip will work.
6. **Reconnect power and press and hold [PROC] & [ATT] & [IPO] & [NB] and turn power on.**
7. Release the four keys.
8. The display will show "OFF". **Turn the VFO dial until the display reads "ON".**
9. **Press [PROC] to store the new RF/TX Range.**
10. Remove the Jumper from step 5 above.
11. Reassemble the radio.

YAESU FT-920

Receive and Transmit Expansion

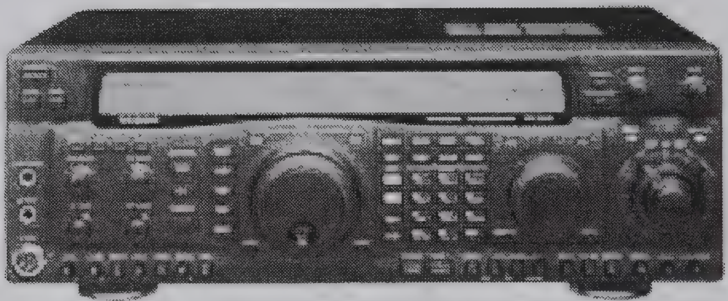
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

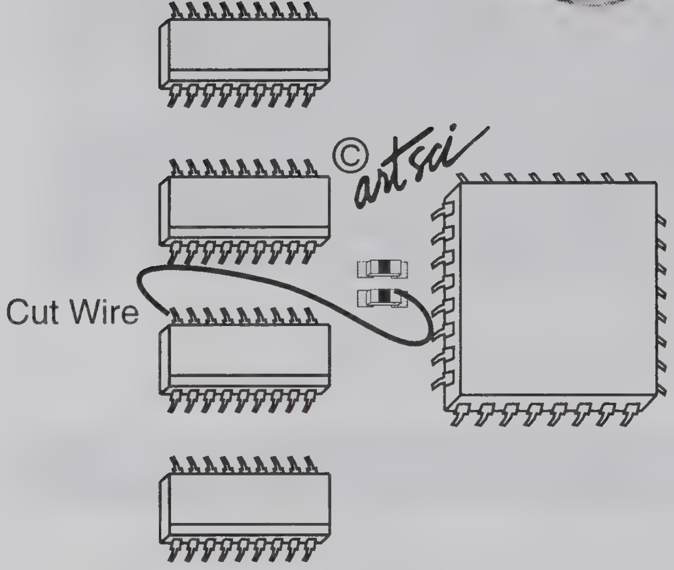
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

1.8 - 30 MHz
48 - 53.999 MHz





Modification Instructions

1. Remove power from the radio.
2. Remove the top and bottom covers.
3. Remove the DSP unut.
4. Locate and **cut the GREEN wire connected betweem R2544 and Q2510.**
5. Replace the DSP Unit
6. Reassemble the radio
7. Press and hold [STEP] and [LOCK] buttons and turn power on.
8. Enter [1] [9] [8] [4] [1] [2] [9] and press [ENTER]
9. Test radio for proper operation.

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

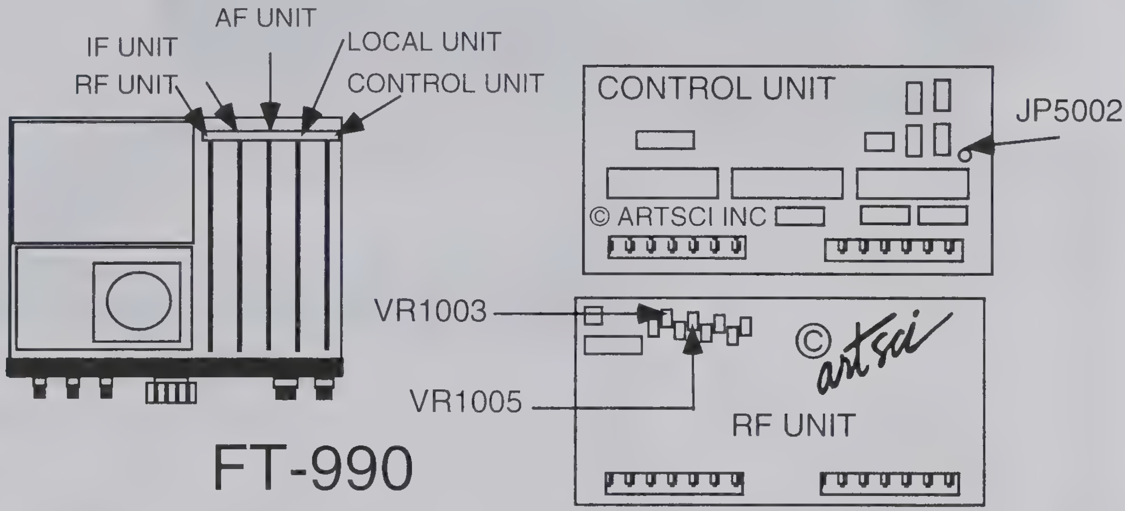
CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

Unknown



Modification Instructions

1. Remove power from the radio.
2. Remove the top cover of the transceiver.
3. Locate the Control unit. It is the rightmost of the vertically-mounted circuits boards.
4. Remove the two mounting screws on the boards restraining brackets.
5. Remove the control unit.
6. Locate Jumper pad JP5002. It is located in the next to IC Q5016. IC Q5016 is the rightmost IC of the three large IC in the center of the board.
7. Solder bridge Pad JP5002.
8. Reinstall the Control unit.
9. Locate VR1003 & VR1005 on the RF unit.
10. Connect a 50 Ohm dummy load and a key to the key jack.
11. Set CW mode and the METER to the ALC setting.
12. Dial Frequency 5.000 MHz.
13. Set the RF Power switch fully clockwise.
14. Close PTT and the key. (TRANSMITTING)
15. Adjust VR1003 so that the ALC meter reads to the right edge of the scale.
16. Check frequency range 4.0 - 6.5 MHz to make sure ALC meter reads at least slightly across the entire range.
17. Dial Frequency 8.000 MHz.
18. Adjust VR1005 so that the ALC meter reads to the right edge of the scale.
19. Check frequency range 8.0 - 10.0 MHz to make sure ALC meter reads at least slightly across the entire range.
20. Replace the top cover.

YAESU FT-1000 FT-1000MP

Receive and Transmit Expansion

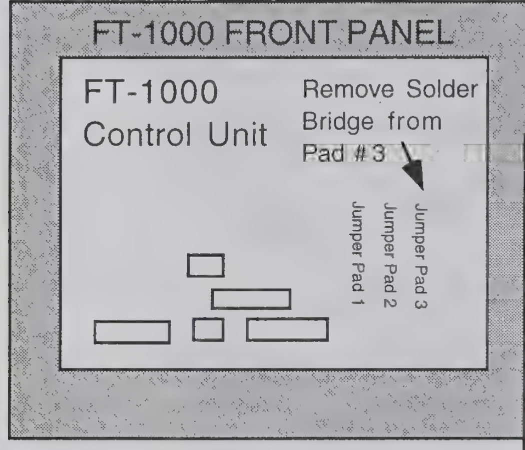
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Modification Instructions

1. Remove power from the radio.
2. Open the case top and bottom.
3. Locate four crews attaching front panel and remove the top screws. Loosen the bottom screws.
4. Tilt front panel forward.
5. On the left side of the radio, remove the plug from the power supply to the front panel. (gray and white wires)
6. Locate jumper position 3 on Control board.
7. **Unsolder the jumper in position 3**
8. Reassemble the radio.
9. **Reset the microprocessor.**
   (Turn off the Backup Switch, located inside the panel window)

Expanded RF Modification FT-1000MP

1. Press [LOCK] & [FAST] and turn the radio on.
2. Press [FAST] & [ENT] keys.
3. Select [9 - 9] on the memory channel block by turning [MEM/VFO) knob COUNTERCLOCKWISE.
4. Select [GEn] by turning the main dial.
5. Press and release the [ENT] key.

Before 15 000 9 - 9 CH

After GEn 000 9 - 9 CH

To restore amateur bands only:

1. Press [FAST] & [ENT] keys.
2. Select [15] by turning the main dial then press [ENT] key.

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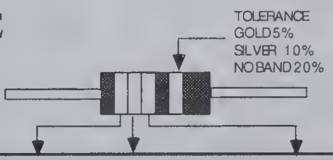
BOB Simpleton's Guide to Color codes

As seen in the **Amateur Radio Trader**

The electronic industry created a standard for color coding parts many, many years ago. The same color code is used on all different types of components. With a little effort, and a good memory, the basic color code can be memorized. In color code sequence is: BLACK, BROWN, RED, ORANGE, YELLOW, GREEN, BLUE, VIOLET, GRAY and WHITE. The number sequence that corresponses with the color code starts with zero; Black=0, Brown=1, Red=2, etc.

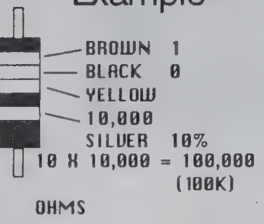
Components using color stripes and surface mount components use the 'significant' digit system paired with a multiplier digit, based on the powers of ten. An additional color stripe is also used to determine the accuracy or tolerance of the component. Higher accuracy components requires more significant digits to accurately describe the value. 5% accuracy parts use two 2 significent digits colors stripes followed by the multliper color stripe. 2% and 1% components often use 3 significent digit colors stripes .

RESISTOR COLOR CODE



COLOR	1st DIGIT	2nd DIGIT	MULTIPLY BY
BLACK	0	0	1
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
VIOLET	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	1,000,000,00
GOLD			0
SILVER			.1
			.01

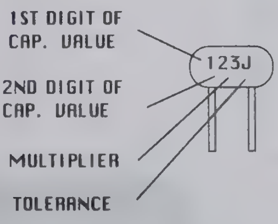
Example



Resistor standard values (significant digits)

10	brown	black	33	orange	orange
11	brown	brown	36	orange	blue
12	brown	red	39	orange	white
13	brown	orange	43	yellow	orange
15	brown	green	47	yellow	purple
16	brown	blue	51	green	brown
18	brown	gray	56	green	blue
20	red	black	62	blue	red
22	red	red	68	blue	gray
24	red	yellow	75	purple	green
27	red	purple	82	gray	red
30	orange	black	91	white	brown

CAPACITORS



MULTIPLIER		TOLERANCE		
	MULTIPLY BY		10pF or less	over 10pF
0	1	B	0.1pF	
1	10	C	0.25pF	
2	100	D	0.5pF	
3	1,000	F	1.0pf	1%
4	10,000	G	2.0pf	2%
5	100,000	H		3%
		J		5%
8	.01	K		10%
9	0.1	M		20%

Most common resistors are in the 5 to 10% tolerance range. Silver is used for 10% and gold is used for 5%. 20% resistors have no tolerance color bar.

One very common resistor is color coded: red red orange gold. Take a moment and see if you can use the attached resistor table and calculate the value..

If you calculated a 22,000, 5% resistor, you are correct. It is calculated like this: 22 x 10^3 = 22,000. What possible readings would you expect if you connected this resistor to an ohm meter?

Since it is a 5% tolerance resistor, the measured value will be between 19.800 and 24,200 ohms. That is calculated be allow 5% above and below the stated value.

Surface mount resistors do not use color stripes. The 2 significent digits and multiplier digit are printed right on the top of the component. These components are very, very small. The printed digits are often so small, you may need a magnifying glass to read them.

A surface mount resistor marked 103 would be a 10,000 ohm resistor (10k ohms). For everyone interested in mathematics, the formula is 10 x 10^3 = 10,000

A little practice will make reading resistors and other electronic componets easy as pi. 73, Bob

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YAESU FT-1500M Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

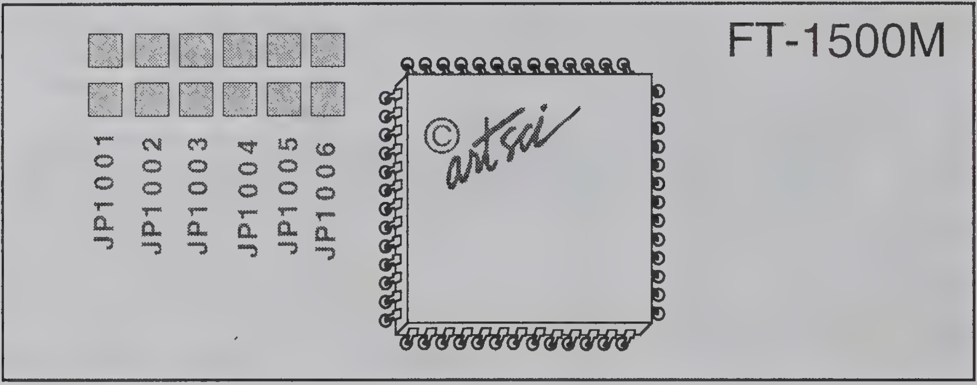
Expansion Range

Not all versions will get full expansion

137 - 174 MHz RX/TX

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



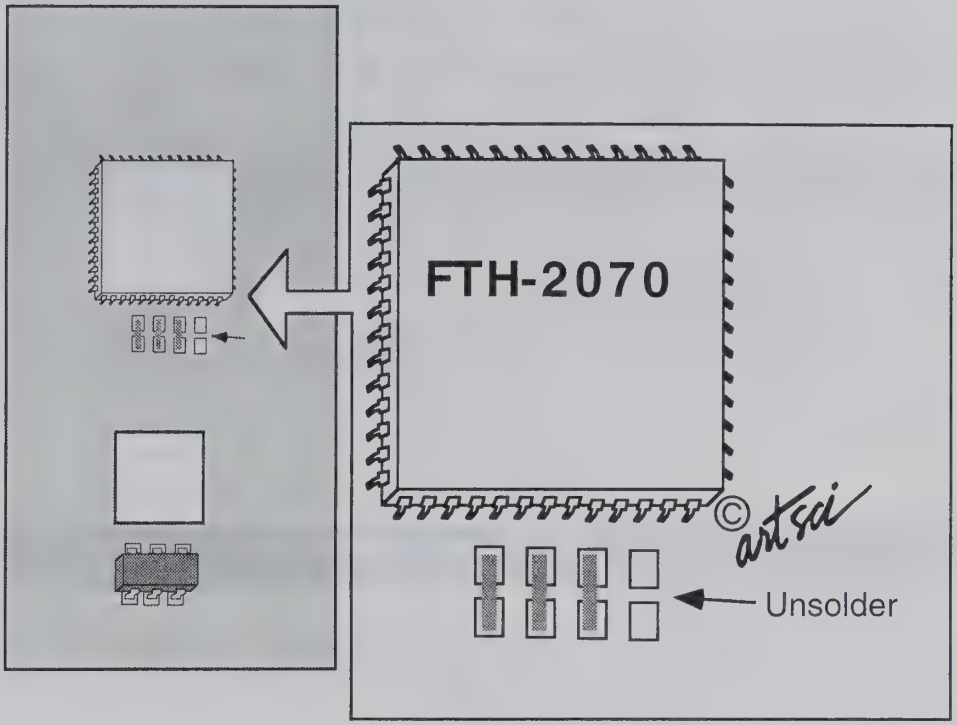
Modification Instructions

1. Remove powerand antenna.
2. Remove screws and open radio
3. **Remove JP1001** (Located on Control Unit as shown)
4. **Solder Jump JP1002 and JP1003**
5. Reassemble the radio
6. Reset the radio. Press and hold D/MR and turn power on

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
134 - 174 MHz
400 - 499 MHz



Modification Instructions

1. Remove battery and Antenna from the radio.
2. Remove screws and open case
3. **Locate and unsolder jumper pad as shown above**
   (Pad connected to Microprocessor pin 11)
4. Reassemble the radio.
5. Reset the Microprocessor
   (Press [PRI] and turn the radio on.)

YAESU FT-2200 Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

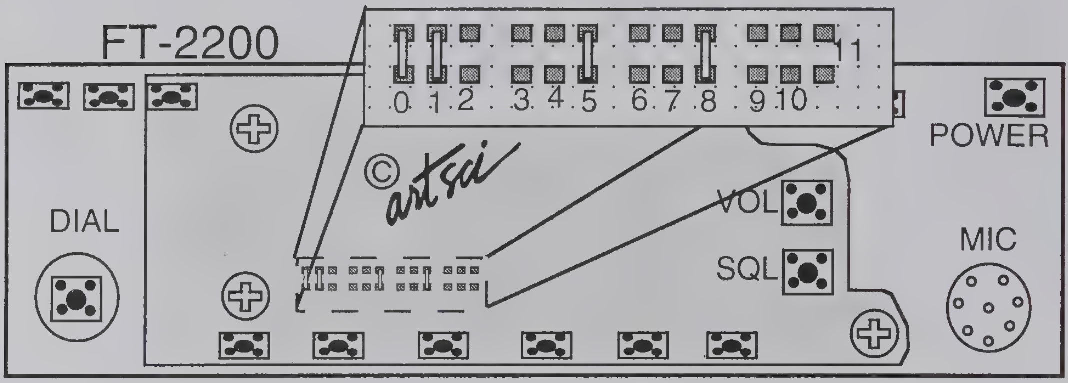
Not all versions will get full expansion

110 - 139.995 AM RX
110 - 180 MHz RX
140- 174 MHz TX

A "*" will appear when frequency is below 140 MHz. The AM mode will store in memory channels.

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Modification Instructions

1. Remove power and antenna
2. Remove top and bottom covers. (the speaker may fall out)
3. Remove the Volume, Squelch and Main tuning knobs from the front of the radio.
4. Remove the front panel (push on all four tabs)
5. Remove the tuning knob retainer nut.
6. Lift off the LCD display assembly.
7. Locate jumper Pads #1,2 & 5.
8. **Remove resistor from pads #1 & 2.**
9. **Remove resistor from pads #5.** (AIRCRAFT Rec Mod)
   (One report suggests the Pad #8 should be jumped in place of pad #5)
10. Reassemble the radio.
11. Reset the microprocessor.
    (Press and hold [MHz] and [CALL] buttons and turn the radio on.

The radio will power up and display 10.000 MHz.

Press [MHz] and dial **110.00** and press **[D/MR]** VHF RX low Limit
Press [MHz] and dial **174.00** and press **[D/MR]** VHF RX High Limit
Press [MHz] and dial **136.00** and press **[D/MR]** VHF TX low Limit
Press [MHz] and dial **174.00** and press **[D/MR]** VHF TX High Limit
Press [F/W] and then **[RPT]** and dial **0.600** and press [RPT] Offset

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION: ▭

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

1240.00 - 1300.00 MHz

Modification Instructions

1. Remove five screws from the top cover and remove the cover.
2. Remove five screws from the bottom cover and remove the cover.
3. Unplug the speaker.
4. Remove the four screws holding the front panel.
5. Locate jumper pad number 7.
6. **Solder bridge pad number 7.**
7. Locate the reset pins (Located on the front panel and clearly marked).
8. Short the reset pins together for one second.
9. Reassemble the radio.

YAESU FT-2400 Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

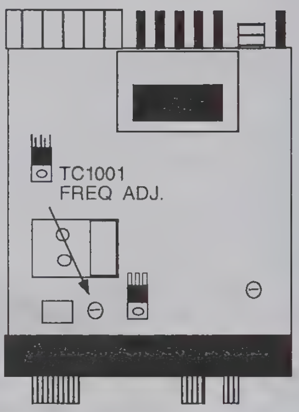
Expansion Range

Not all versions will get full expansion

118 - 174 MHZ RX
140 - 174 MHz TX

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



Modification Instructions

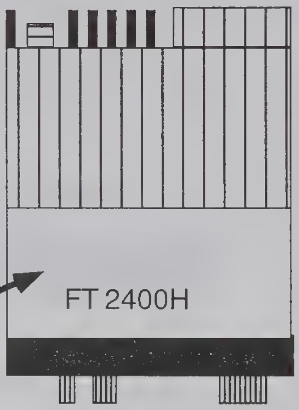
1. Remove Power and Antenna.
2. Locate and remove the two Allen screws from the front panel.
3. Locate and unsolder jumper pad 2. (or follow option below)
4. Locate and solder jump pads 1 & 3.
5. Reassemble the radio.

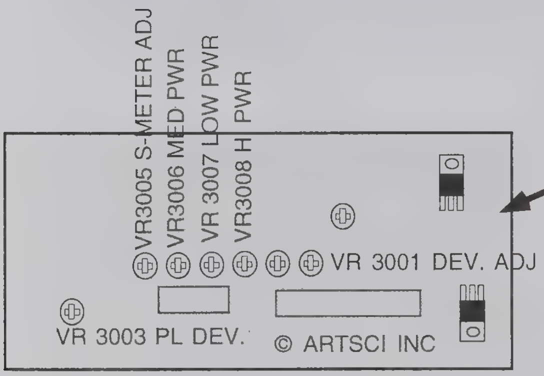
Option #2

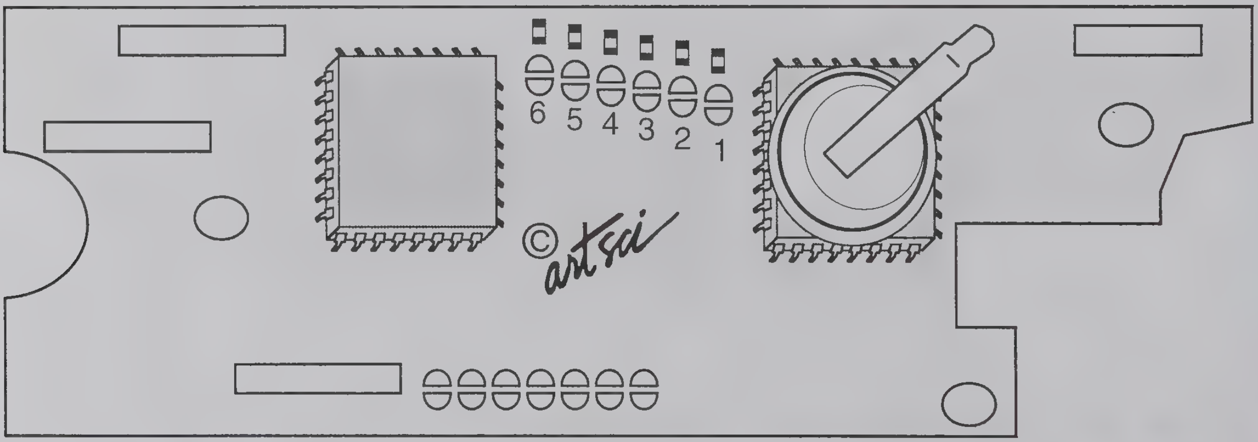
1. Follow steps above, except leave solder pad 2 jumpered.
2. Turn radio on and set the upper and lower limits:

Select 138.00 MHz and Press [D/MR] button	(lower RX limit)
Select 174.00 MHz and Press [D/MR] button	(High RX limit)
Select 138.00 MHz and Press [D/MR] button	(lower TX limit)
Select 174.00 MHz and Press [D/MR] button	(High TX limit)

- TONE BURST - Solder Pad # 6
- Auto-offset is disabled
- One report states that removing Jumper 2 will restore auto-offset







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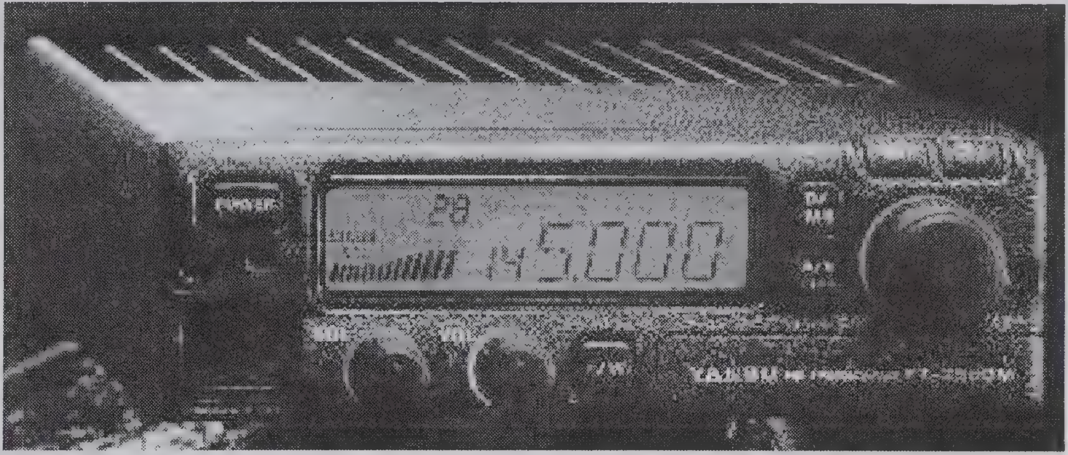
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

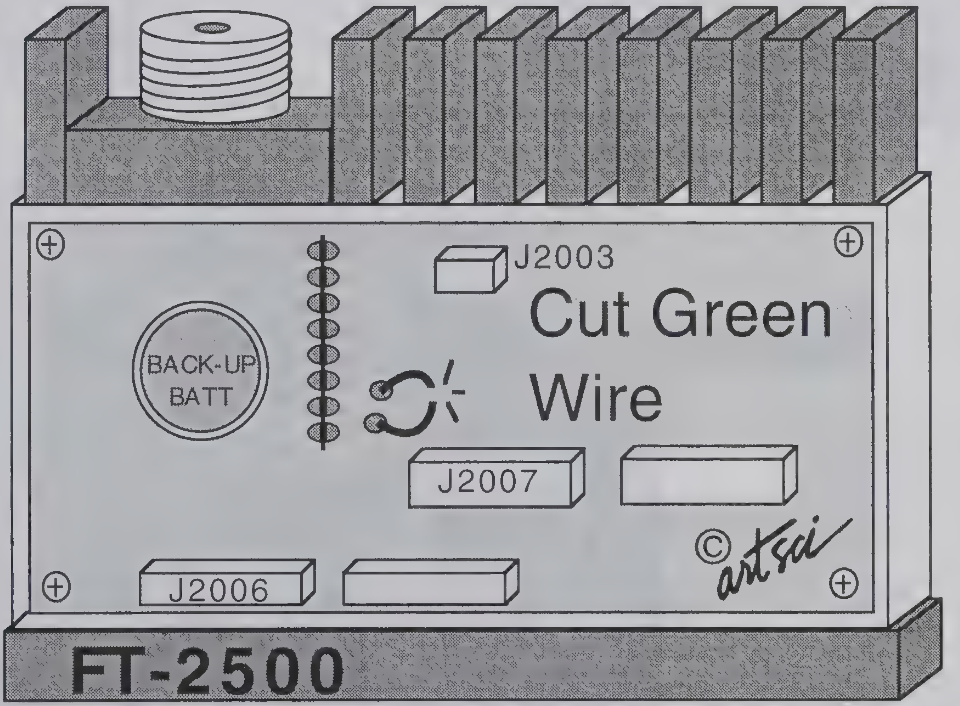
Expansion Range
Not all versions will get full expansion
140 - 174 MHz



Modification Instructions

1. Remove Power and Antenna.
2. Remove five (5) screws holding the top cover.
3. Locate and **cut GREEN COLOR WIRE.**
   (The Green wire is located between jumper pad #8 & Ground.)
4. Reassemble the radio.

NOTE: One report instructs that Jumper #3 may need to be solder jumped.



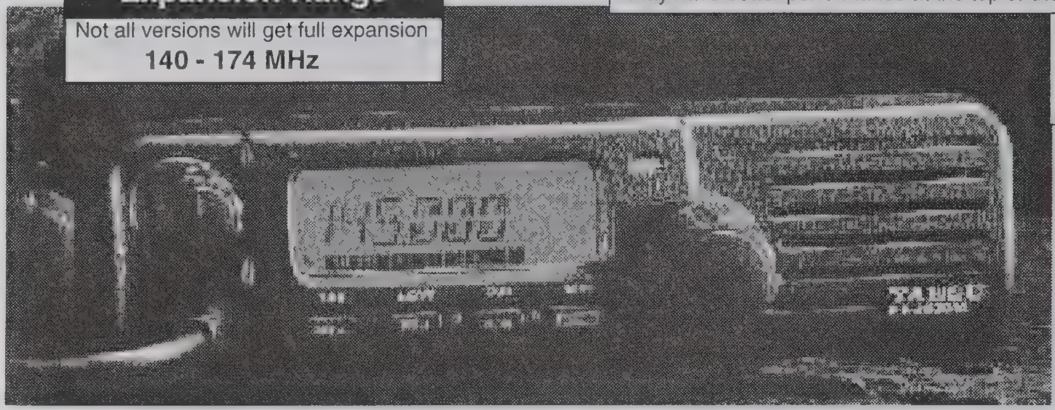
YAESU FT-2600 Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

140 - 174 MHz

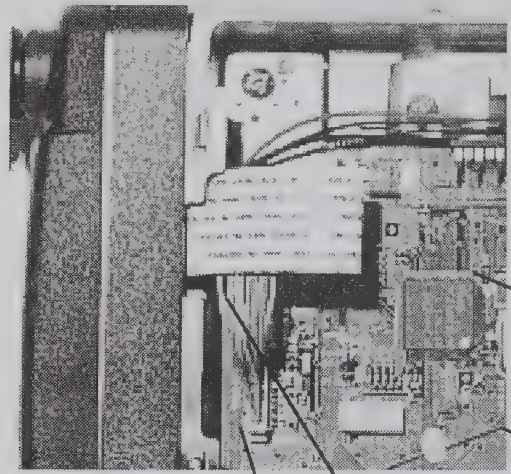


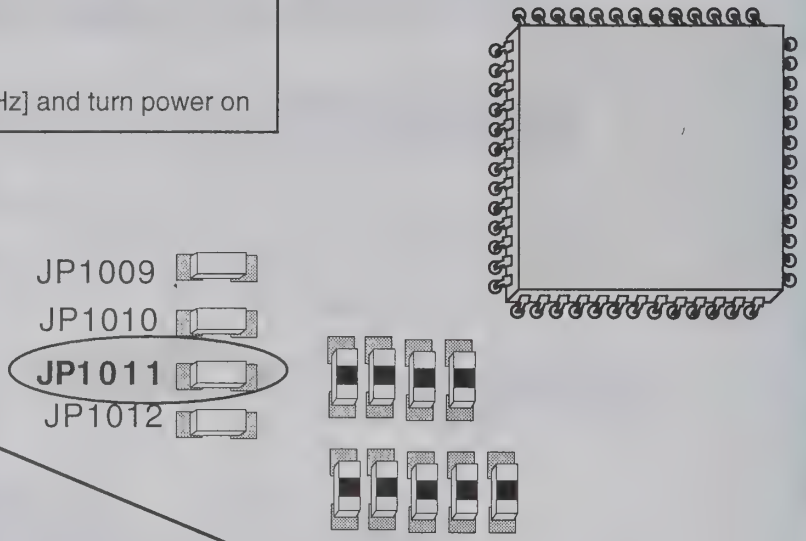
CAUTION:

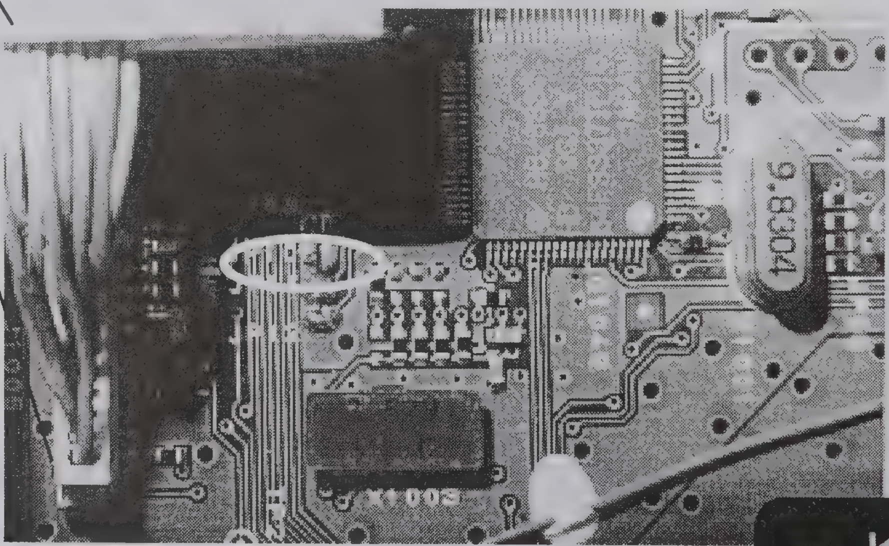
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Modification Instructions

1. Remove Power and Antenna.
2. Remove top cover
3. **Locate and unsolder JP1011**
4. Reassemble the radio.
5. Press and hold [A/N] & [D/MR] & [MHz] and turn power on







Receive and Transmit Expansion

YAESU FT-3000

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

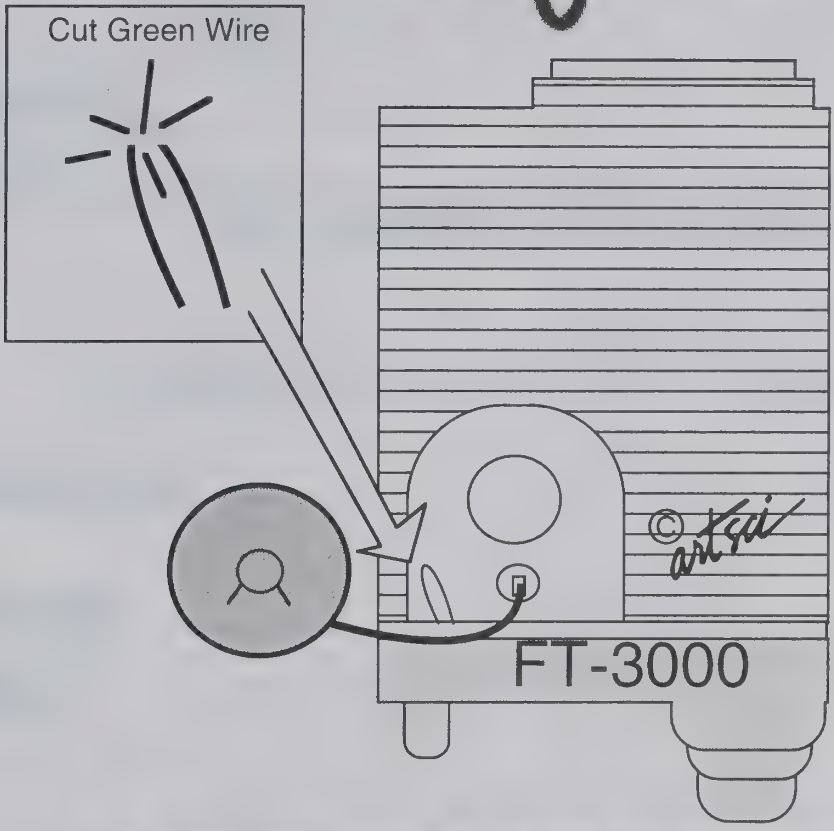
CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

140 MHz - 174 MHz TX
110-180 MHz
300-520 MHz
800-999 MHz (cellular blocked) RX



Modification Instructions

1. Remove Power and Antenna .
2. Remove seven screws from the top cover.
3. Remove the top cover
4. Locate and lift the speaker away from the heatsink.
5. **Locate and cut green wire loop.** (tape end to prevent shorting)
6. Reassemble the radio
7. Replace tPower and antenna.
8. Press and hold the [VFO/MR] and [F1] buttons and turn the radio on.

YAESU FT-4700 Receive and Transmit Expansion

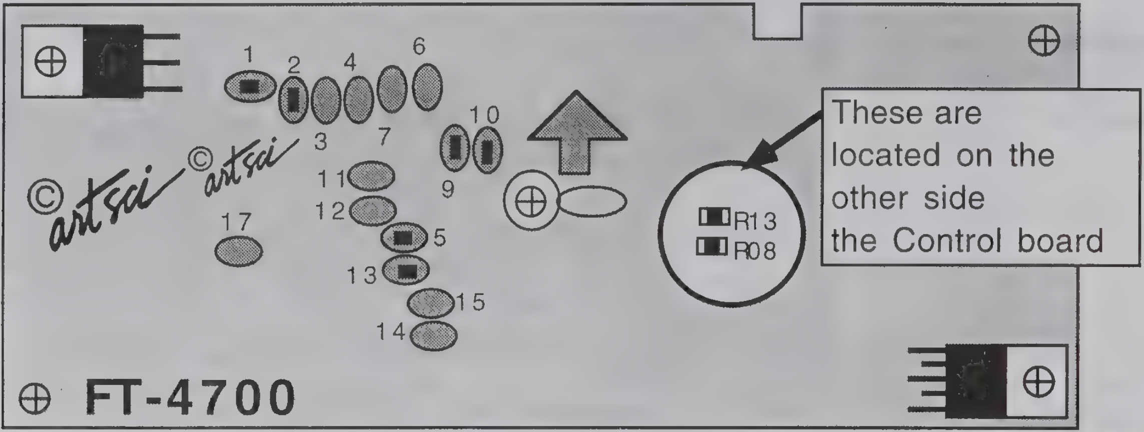
Expansion Range

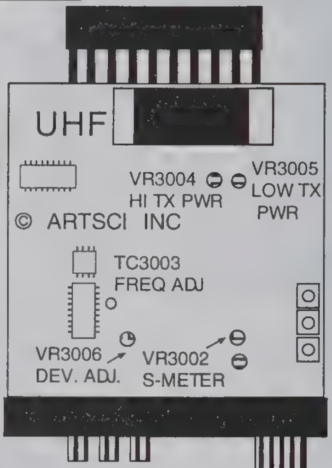
Not all versions will get full expansion

RX :	138 MHz - 174 MHz	410 MHz - 475 MHz
TX :	138 MHz - 174 MHz	410 MHz - 475 MHz

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



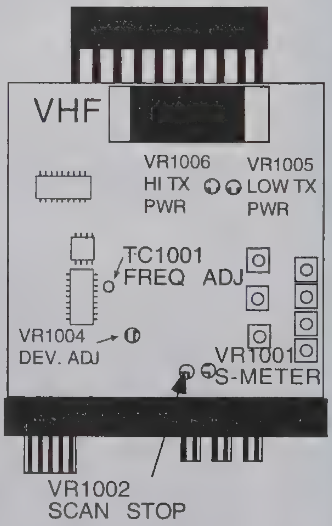


Modification Instructions

1. Remove Front Panel.
2. Locate and **jump pads 1,2,5,9,10 & 13.** Solder short them carefully. (The other jumper pads must remain undisturbed)
3. Reassemble radio.
4. Turn power on. (The microprocessor has been reset)
5. Use the [UP] & [DOWN] buttons and dial to set the UHF range as follows :
   410.000 MHz Press [D/MR] button
   475.000 MHz Press [D/MR] button
6. The display will show 47.75 (IF freq. for UHF). Press [D/MR]
7. Use the up/down buttons and dial to set the VHF range as follows :
   138.000 MHz Press [D/MR] button
   174.000 MHz Press [D/MR] button
8. The display will show 17.3 (IF freq. for VHF).Press [D/MR]
9. The repeater shifts for both bands are reset to 000. They must be set using the [F] and [PRT] buttons. Refer to page 27 in the user manual.

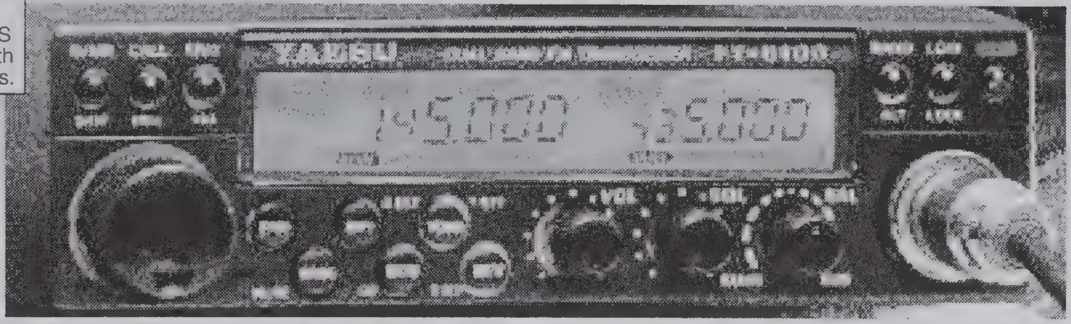
Beep Level Reduction

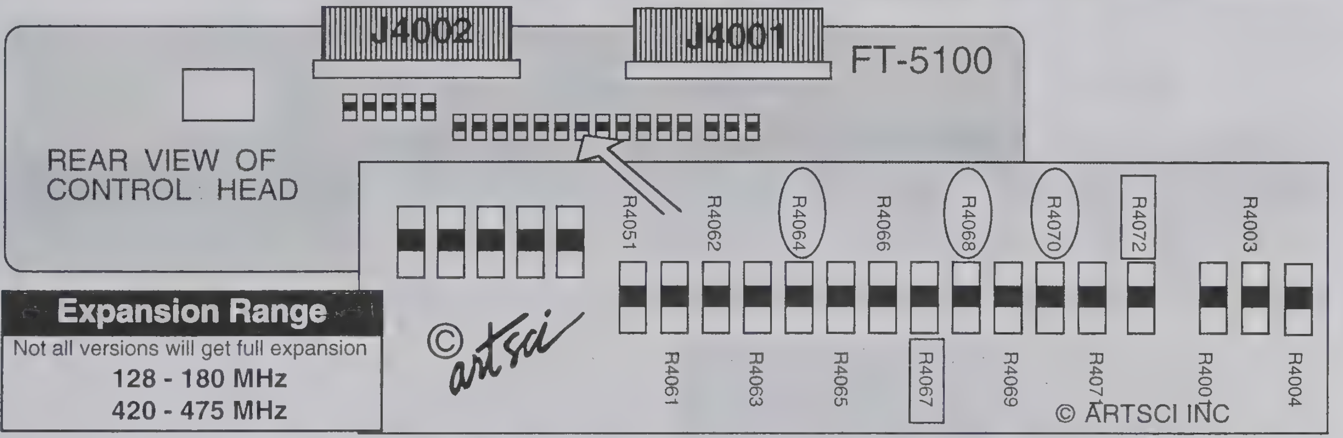
1. Remove Front Panel
2. Remove the five screws holding Control unit in place.
3. Remove P10 from J04
4. Remove P09 from J03
5. Carefully flip the Control board to access the back side.
6. Locate R08 and R13.
7. Replace R08 and R13 with 560 ohm chip resistors (YAESU # J24205561
8. Reconnect the two Plugs P10 & P09
9. Reassemble the radio.



Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.





Expansion Range

Not all versions will get full expansion

128 - 180 MHz

420 - 475 MHz

Modification Instructions

1. Remove power and antenna from the radio.
2. Remove 6 screws from top and bottom covers, remove the covers (watch speaker).
3. Remove the 2 silver screws from each side of the radio securing the control head.
4. Carefully pull the Control Head from the radio. DO NOT REMOVE RIBBON CABLES.
5. Locate and **remove chip resistor R4072.** (RX mod)
6. Locate and **remove chip resistor R4067.** (Mic/Band mod)
7. Locate and **install jumpers in positions R4070, R4068 & R4064**. (RX mod)
   STOCK US JUMPERS: 4001, 4003, 4004, 4051, 4061, 4062, 4067, 4072
   POST MOD JUMPERS 4001, 4003, 4004, 4051, 4061, 4062, 4064, 4068, 4070
8. Reassemble the radio.
9. Turn the radio on
   (The display will show 300.000 & 20.000)
10. Press [MHz] and dial 420.00 and press [D/MR] - UHF RX low limit
11. Press [MHz] and dial 475.00 and press [D/MR] - UHF RX high limit
12. Press [MHz] and dial 420.00 and press [D/MR] - UHF TX low limit
13. Press [MHz] and dial 475.00 and press [D/MR] - UHF TX high limit
14. Press [MHz] and dial 128.00 and press [D/MR] - VHF RX low limit
15. Press [MHz] and dial 180.00 and press [D/MR] - VHF RX high limit
16. Press [MHz] and dial 128.00 and press [D/MR] - VHF TX low limit
17. Press [MHz] and dial 180.00 and press [D/MR] - VHF TX high limit
18. Press [F/W] then [RPT] and dial 5.000 and press [RPT] - UHF offset
19. Press [F/W] then [REV] and dial 25.0 and press [RPT]. - Channel Step
20. Press [BAND] then [F/W] then [RPT] and dial 0.600 and press [RPT] - VHF offset.

SOFT RESET (Memory clear) - Press and hold [D/MR] & [REV] and turn radio on.

MORE ON NEXT PAGE

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Cross Band Operation

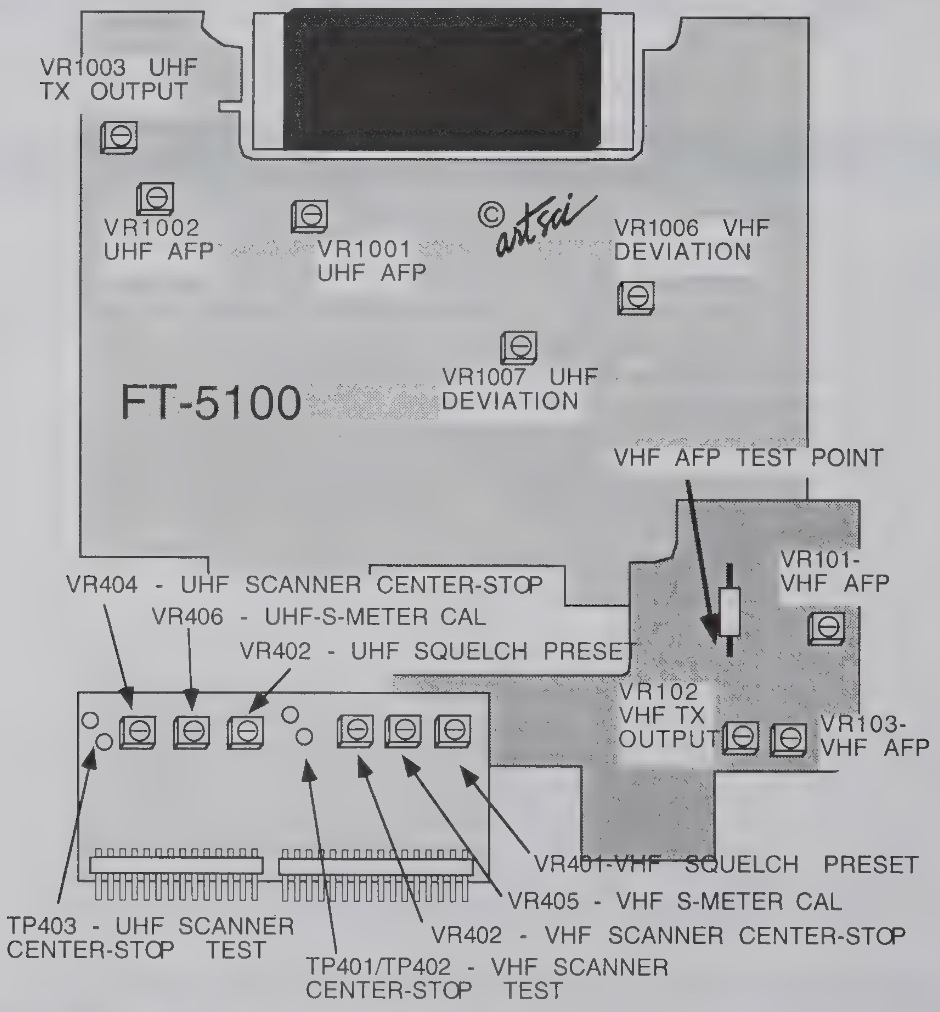
1. Select the desired VHF & UHF frequencies
2. Select low power transmit on both bands (To protect your radio)
3. If desired, adjust the TX time out timer value. (The default is 15 minutes)

To adjust: Press and hold [LOW] & turn power on.
Dial desired time out value (0-60 minutes)
Turn radio off.

TURN ON - Press and hold [RPT] and turn radio on.
TURN OFF - Press and hold [RPT] and turn radio on.

Microphone Modification

Remove solder from Jumper R4067 to make Microphone [D/MR] button switch band on the radio.



Receive and Transmit Expansion

YAESU FT-5200

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

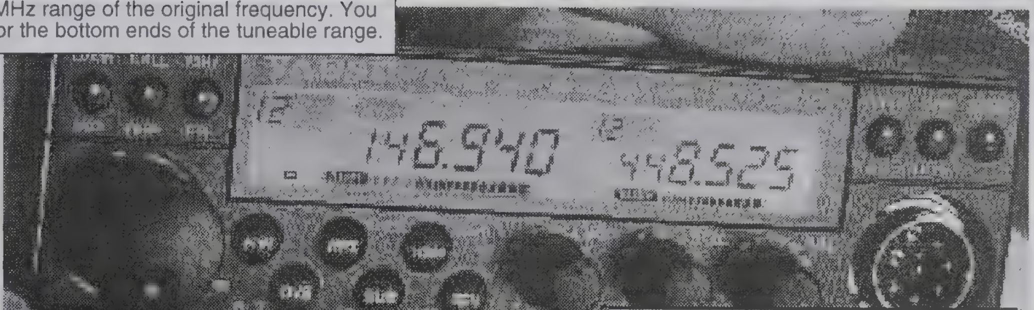
CAUTION:

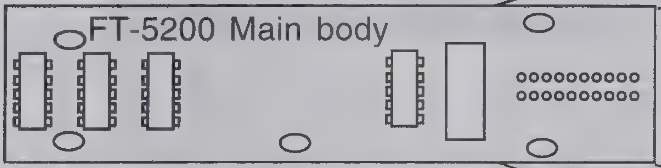
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

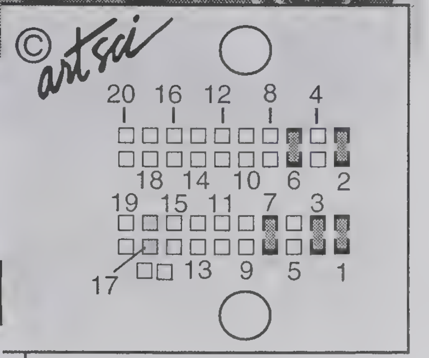
Expansion Range

Not all versions will get full expansion

Unknown







Modification Instructions

1. Remove power from the radio.
2. Release and remove the front panel.
3. Remove the six screws from the top cover of the radio.
4. Remove the six screws from the bottom of the radio.
5. Remove the top and bottom covers.
   (CAUTION: the speaker might fall out.)
6. Remove the two screws & front control head mounting plate from the radio.
7. Locate solder pads 1 - 7.
   (Standard jumpered pads are 2 and 7 only)
8. **Solder jump pads 1,3 and 6**
   (Pads 1,2,3,6 & 7 are now jumpered)
9. **Unsolder jump pad 17.** (X-Band repeater mod) May be done at the factory!
   Caution: Be sure to work on PAD 17. see drawing below
10. Install front panel mounting plate.
11. Reassemble the radio.
12. Reconnect the power to the radio.
13. **Press and hold [D/MR], [F/W] & [REV] keys and turn radio on.**
    (Display will show 000.000 & 300.000 on the display)
14. **Set the VHF Receive and Transmit limits:**

Enter 118.00 MHz and press [D/MR]	(VHF RX Low)
Enter 174.00 MHz and press [D/MR]	(VHF RX High)
Enter 140.00 MHz and press [D/MR]	(VHF TX Low)
Enter 174.00 MHz and press [D/MR]	(VHF TX High)

15 **Set the UHF Receive and Transmit limits:**

Enter 420.00 MHz and press [D/MR]	(UHF RX Low)
Enter 475.00 MHz and press [D/MR]	(UHF RX High)
Enter 420.00 MHz and press [D/MR]	(UHF TX Low)
Enter 475.00 MHz and press [D/MR]	(UHF TX High)

16. Press [Function] then [RPT] and select 5 MHz Repeater offset for UHF band.
17. Press [Function] then [RPT] and select 600 kHz Repeater offset for VHF band.

More on Next Page

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Cross Band Repeater

To activate X-Band repeater function:

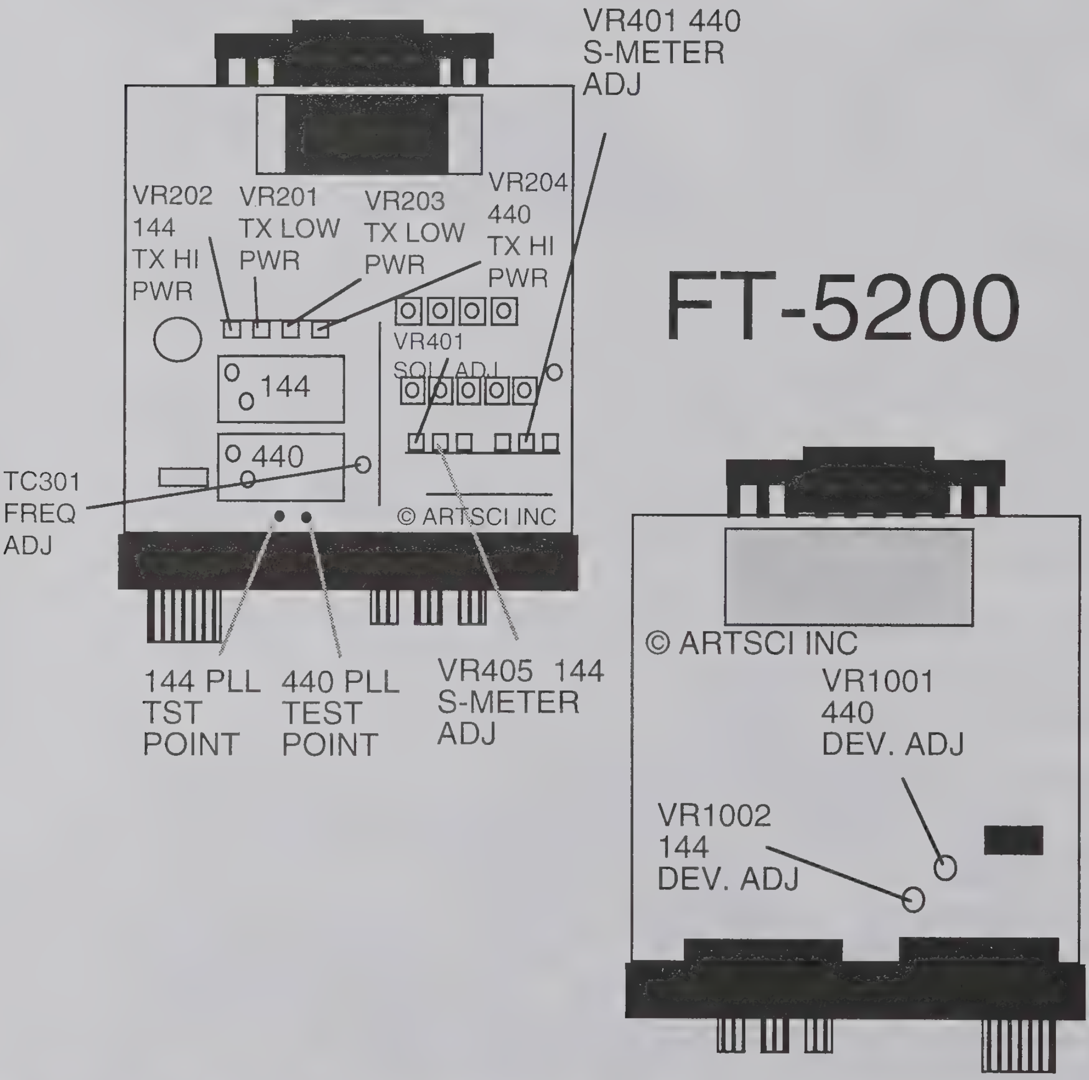
Press and hold [RPT] and turn power on.
It is recommended that you unplug the microphone during X-Band operation.
(The Mic is live)

- Adjust the volume control to adjust repeat audio level.

Other Options

Override automatic display dimmer:
Press and hold [MHz] and turn radio on: Use Channel knob to select brightness.

Keyboard VHF Expanded Receive:
Press and hold [DVS] & [MHz] keys and turn radio on.



Receive and Transmit Expansion — YAESU FT-6200

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

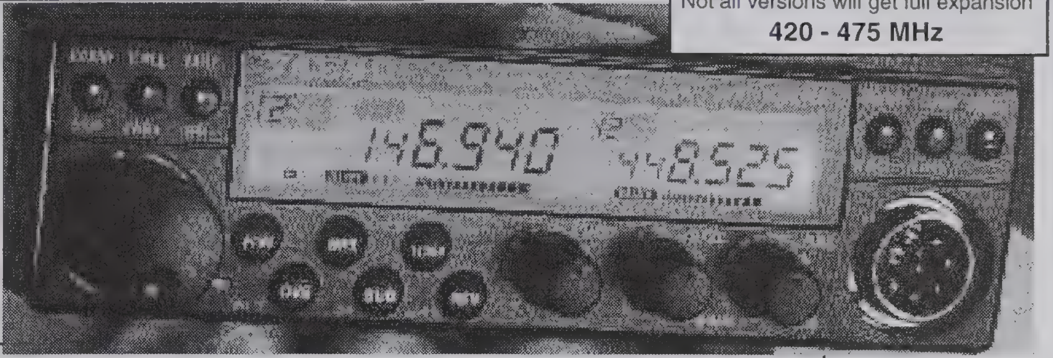
Expansion Range

Not all versions will get full expansion

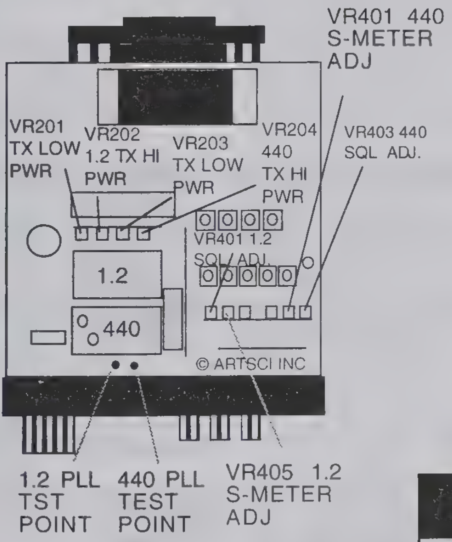
420 - 475 MHz

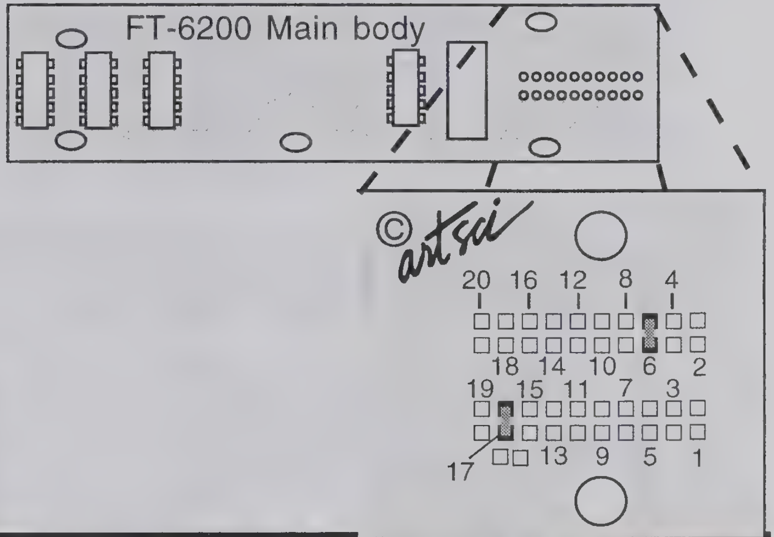
CAUTION:

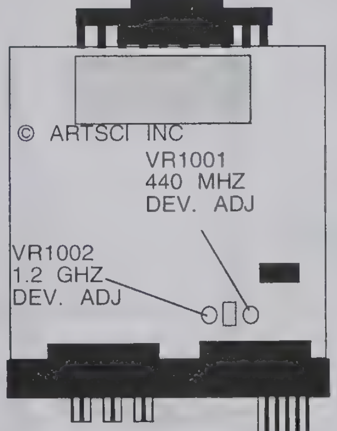
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



To activate X-Band repeater function: Press and hold [RPT] and turn power on.
To override automatic display dimmer: Press and hold [MR] and turn power on and select the desired brightness level)







Modification Instructions

1. Remove power from the radio.
2. Release and remove the Control head.
3. Remove the top and bottom covers. Six screws secure the covers on.
4. Remove the two silver screws holding the control head mounting bracket.
5. Remove the mounting bracket.
6. **Locate and solder jumper pad #6.**
   Pads 2, 4, 6, 7, 8, 15, 17 & 18 will now be jumpered.
7. **Locate and remove solder jumper pad #17.** (X-Band repeater mod)
   Caution: Make sure you jumper the proper pad. see drawing below.
8. Reassemble the radio.
9. Reconnect the power.
10. **Press and hold [D/MR], [F/W] & [REV] and turn the power on.**
    The radio will now show 300.000
11. **Enter the following band limits:**

    420.00 and then press [D/MR] (UHF Rx low limit)
    475.00 and then press [D/MR] (UHF Rx high limit)
    420.00 and then press [D/MR] (UHF Tx low limit)
    475.00 and then press [D/MR] (UHF Tx high limit)
12. Press [FUNCTION] and then [RPT] and select 5.000 MHz repeater offset.

BOB Simpleton's Guide to PL Decoding/ speaker Muting

It is sometimes useful to keep your radio on at all times while waiting for an important call. However the chatter of other users may become a problem.

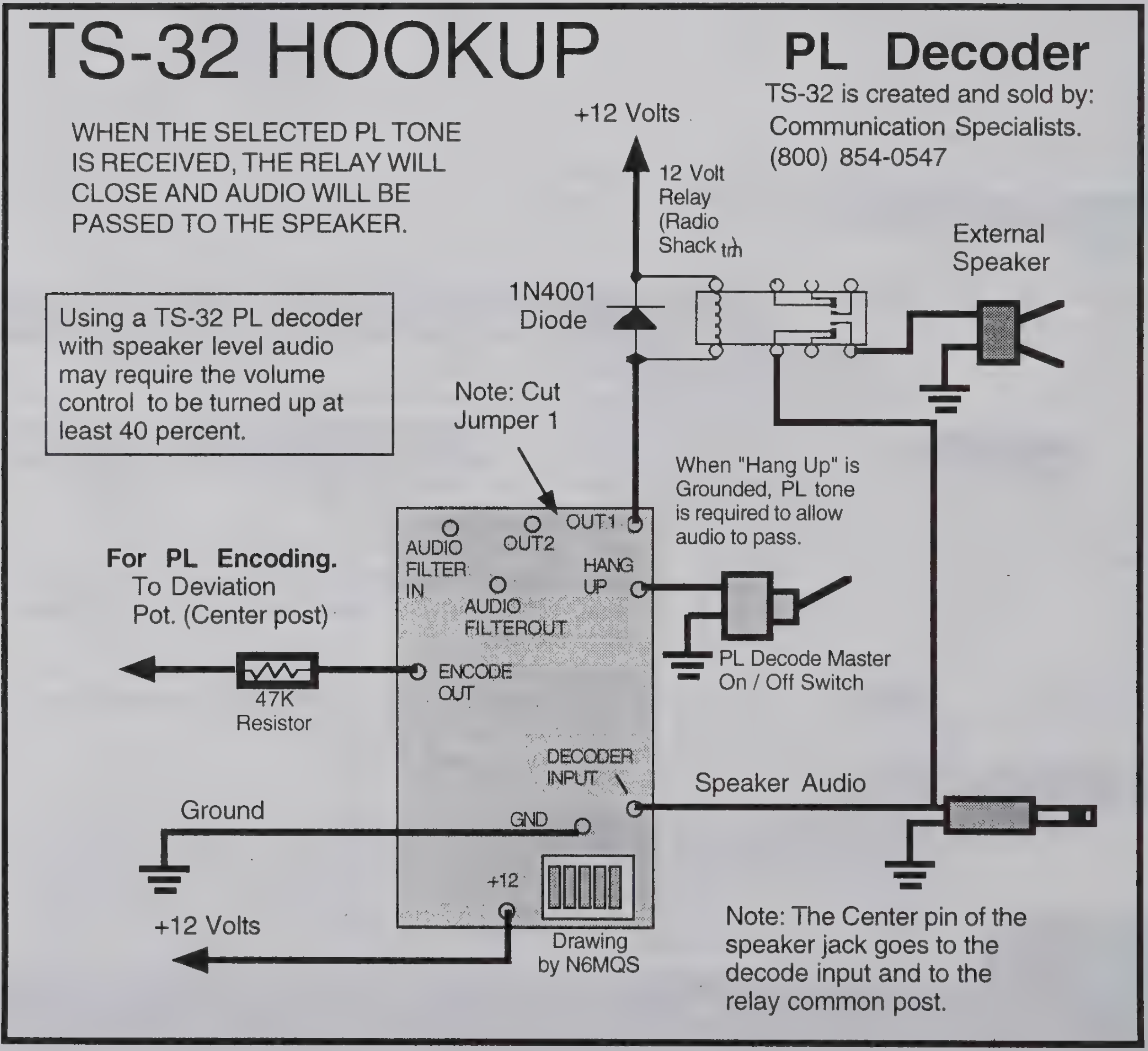
My good friend Bill likes to have his wife Jan monitor the base radio at home. During high radio traffic times, she will turn the volume down to avoid listening to others. It is then to low for her to hear Bill when he calls.

Bill put together this simple PL decoder circuit and attached it to his base radio. Now the radio speaker is disconnected unless the proper subaudable PL tone is used. Bill always transmits the correct PL tone when he wants to talk to Jan at home. He keeps the base radio volume very high so Jan can hear him calling from almost anywhere in the house.

His circuit was created using the popular TS-32 PL Decoder by Communication Specialists. Most repeater systems use this decoder because it is very reliable and simple to use.

He has included a defeat switch to remove the PL requirement when using the radio for normal two-way communications. The TS-32 PL Decoder board has a special "HANG UP" pin that is grounded through the switch and will keep the relay triggered and all audio will pass to the speaker.

Bill suggested using the other side of the relay to activate a horn, buzzer or light of some kind. I built one of these circuits and used it in the car to flash a light when one of my friends call me. I see the light and turn the stereo down and answer the call. 73 and have some fun.



TS-32 HOOKUP

PL Decoder

TS-32 is created and sold by:
Communication Specialists.
(800) 854-0547

WHEN THE SELECTED PL TONE IS RECEIVED, THE RELAY WILL CLOSE AND AUDIO WILL BE PASSED TO THE SPEAKER.

Using a TS-32 PL decoder with speaker level audio may require the volume control to be turned up at least 40 percent.

When "Hang Up" is Grounded, PL tone is required to allow audio to pass.

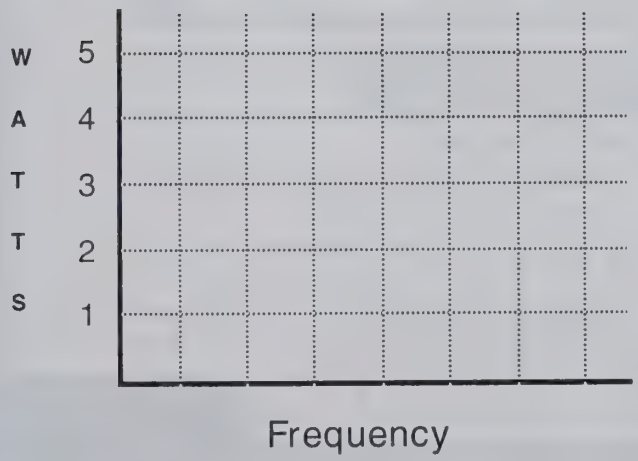
Note: The Center pin of the speaker jack goes to the decode input and to the relay common post.

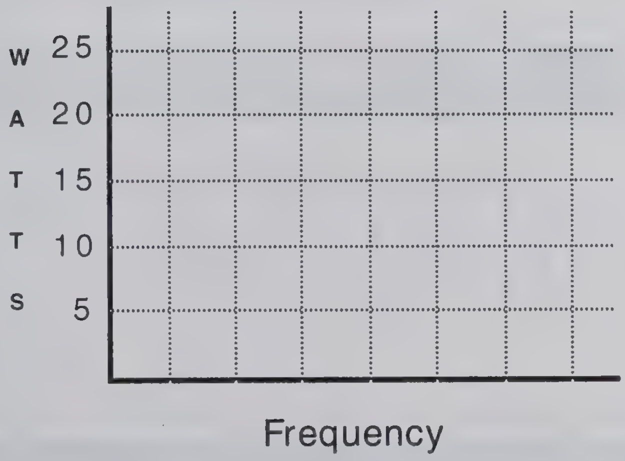
Performance Report

Radio ______________________ Date ____________

Owner : Name ______________________________
Address ______________________________
City ______________ St. Zip ______________
Phone ( ) - ______________________________

Description	Before	After
Power out (Low)	________ Watts	________ Watts
Power out (High)	________ Watts	________ Watts
Frequency Error (Simplex)	________ Hz	________ Hz
Frequency Error (Offset)	________ Hz	________ Hz
Receive Sensitivity (Mid-band)	________ uv	________ uv
Receive Sensitivity (____MHz)	________ uv	________ uv
Receive Sensitivity (____MHz)	________ uv	________ uv
PL Deviation	________ Hz	________ Hz
DTMF Deviation	________ KHz	________ KHz
Audio Deviation	________ KHz	________ KHz
Lowest usable Freq @ .5 Pwr	________ MHz	________ MHz
Highest usable Freq @ .5 Pwr	________ MHz	________ MHz





YAESU FT-7400 Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

Expansion Range

Not all versions will get full expansion

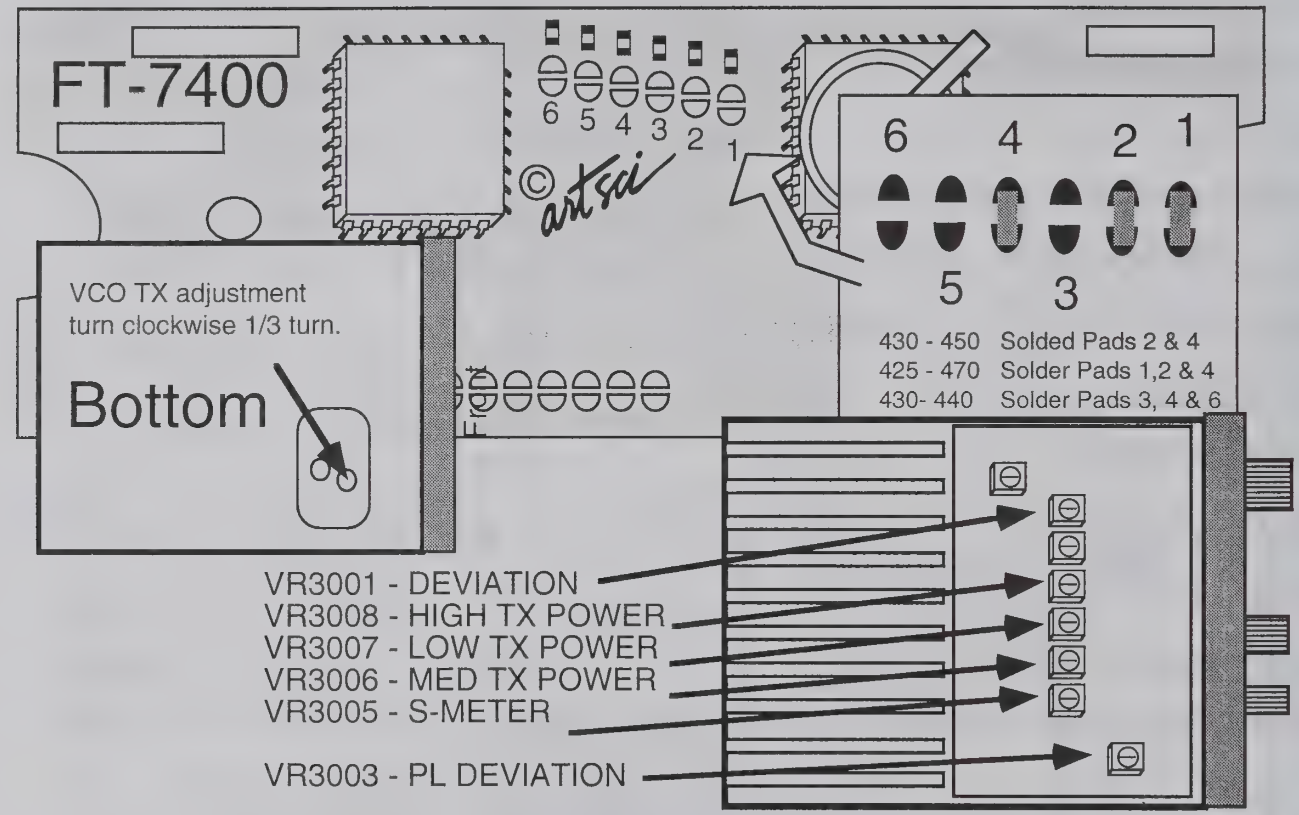
420 - 470 MHz

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Modification Instructions

1. Remove power from the radio.
2. Remove Front Panel.
3. Locate solder pad #1. (Behind front control panel)
4. **Solder jump pad # 1**
5. Reassemble the radio.



VCO TX adjustment turn clockwise 1/3 turn.

430 - 450 Solded Pads 2 & 4
425 - 470 Solder Pads 1,2 & 4
430- 440 Solder Pads 3, 4 & 6

Receive and Transmit Expansion

YAESU FT-8000

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

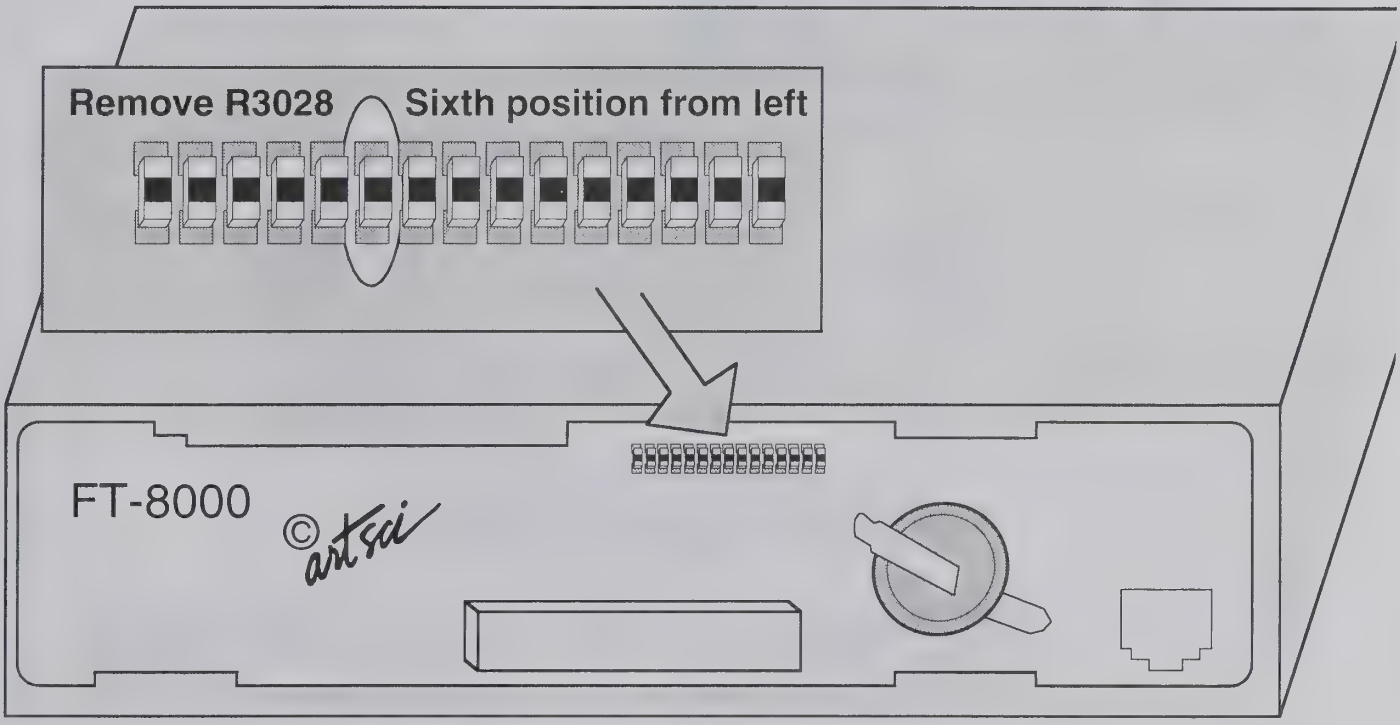
CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

RX: 110 - 550 MHz / 750-1300 MHz

TX 110-174 MHz / 410 - 480 MHz



Modification Instructions

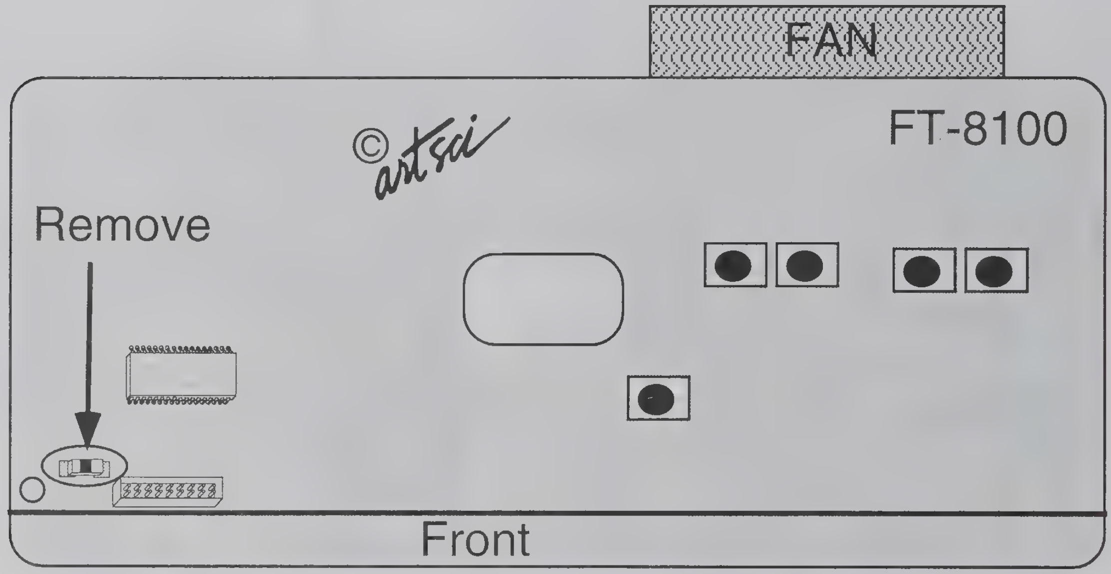
1. Disconnect power and antenna.
2. Remove screws from top and bottom covers and remove panels.
3. Remove the front panel by gently flifting the plastic housing in all 6 places where it connnects to the chassis. (DO NOT REMOVE ANY SCREWS)
4. Locate the Control unit, mounted vertically to the front of the chassie.
5. Locate and remove R-3028
6. Reassemble the radio.
7. **Reset the microprocessor**
   (Press and hold [VFO/M] & [REV] & turn power on.

YAESU FT-8100 Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
137 - 174 MHz / 410-480 MHz



Modification Instructions

1. Disconnect power and antenna.
2. Remove screws from the top cover (with speaker) and remove cover.
3. Looking down inside the top of the radio, locate and **remove the chip resistor** as shown in the diagram.
4. Reassemble the radio.
5. **Reset the microprocessor**
   (Press and hold [MR] & [REV] & turn power on.)

Receive and Transmit Expansion

YAESU FT-8500

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:

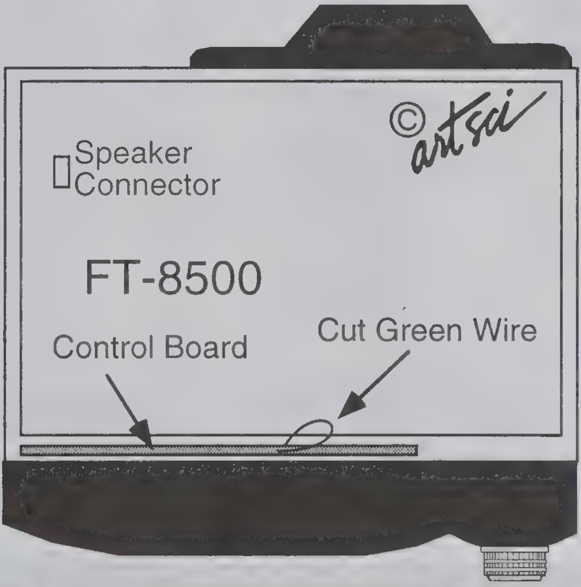
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

137 - 174 MHz

410 - 470 MHz



Modification Instructions

1. Disconnect power and antenna.
2. Remove screws from covers.
3. Gently tilt up the top cover and unplug the speaker.
4. Locate and **cut the Green wire** on the control board (it is a vertical board)
   You may need to remove the four screws holding the front assembly.
5. Reassemble the radio.
6. **Reset the microprocessor**
   (Press and hold [D/M] & [REV] & [D] & turn power on.
   (Turn off again)
   (Press and hold [SCAN] & [HOME] & turn on. - Exp RX mod)

ALTERNATE RESET: Press and hold [D/MR],[ENT] & [REV] and turn power on.

YAESU FT-VX-1R Receive and Transmit Expansion

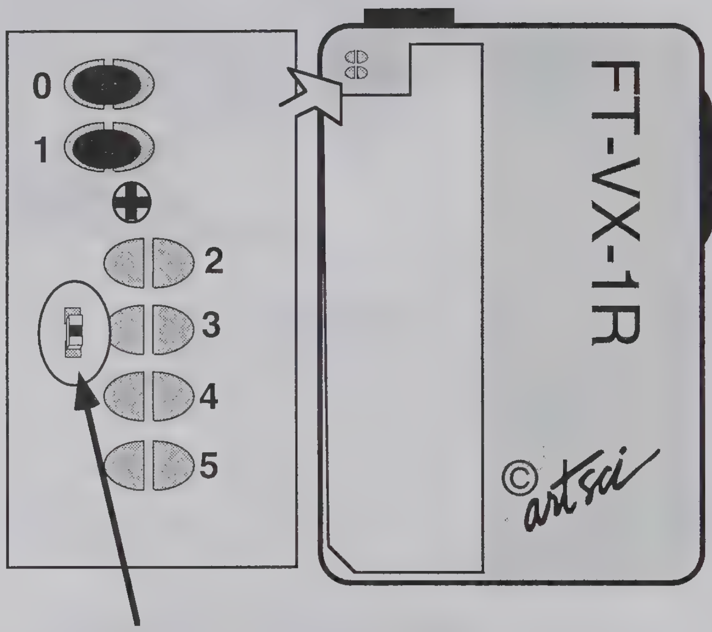
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

137 - 170 MHz
420 - 469 MHz



Solder Jump both pads

Remove Resistor

Modification Instructions

1. Remove Battery and Antenna .
2. Remove the three black screws on the rear cover.
3. Carefully remove the back cover. **CAUTION:** the left side of the back cover is attached to the front cover using a compression clip. If you force the two covers apart, you may break the clip and the covers will not properly reconnect after the mod. Some users report a small spade screwdriver inserted from the borrom of the radio will help open the clip.
4. **Solder jump the two jumper pads** # 0 & 1 located at the top left. (They are the only pads visible)
5. Locate and **remove Chip resistor** next to pad # 3
6. Reassemble the radio. **CAUTION**: you may need to position the compression clip under the plastic cover protecting the circuit board.
7. **Reset the microprocessor.** (Press and hold [M/V] & [AR] and turn on the radio.)

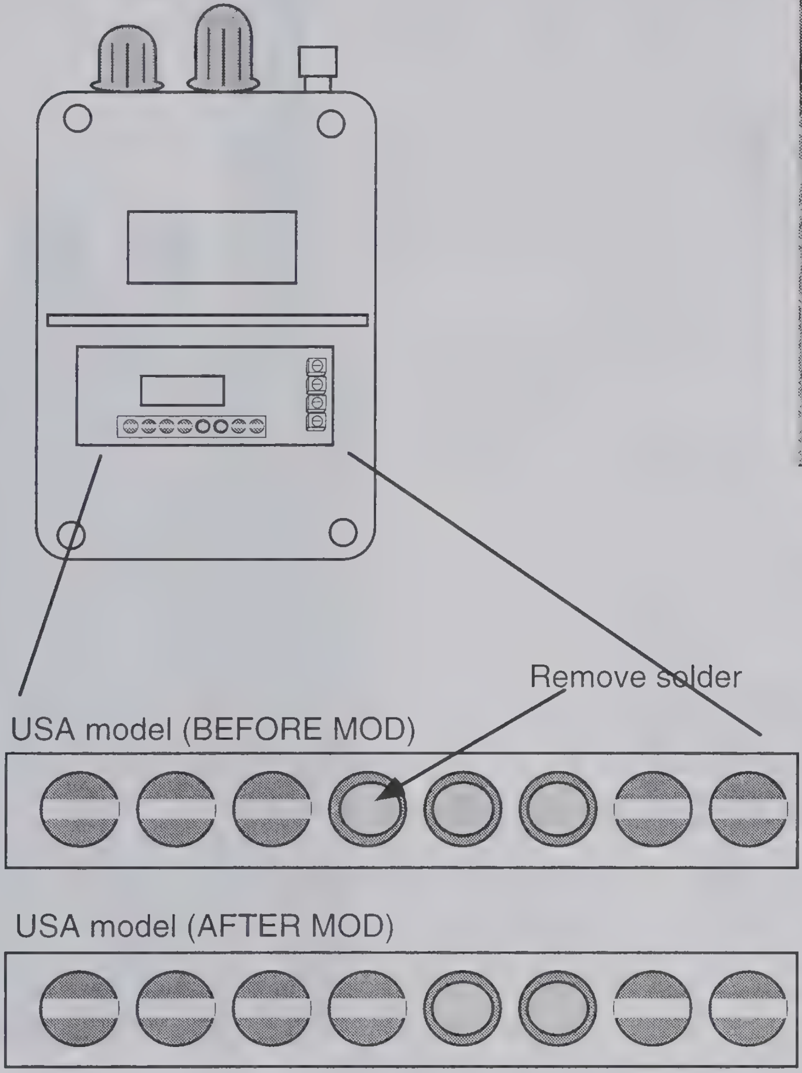
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

137 - 174 MHz RX
140-174 MHz TX
420 - 470 MHz TX



Modification Instructions

1. Remove Battery and Antenna .
2. Remove the cover for Pressure Sensing Unit (SU-1). See Owner Manual
3. Remove the SU-1 Option board (if installed)
4. Locate solder pads on lower left side.
5. Remove solder from the fourth pad from the left (JP5)
6. Reassemble the radio
7. **Reset the microprocessor.** (Press and hold [MR] & [VFO] & [4] and turn on the radio.)

Receive and Transmit Expansion

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

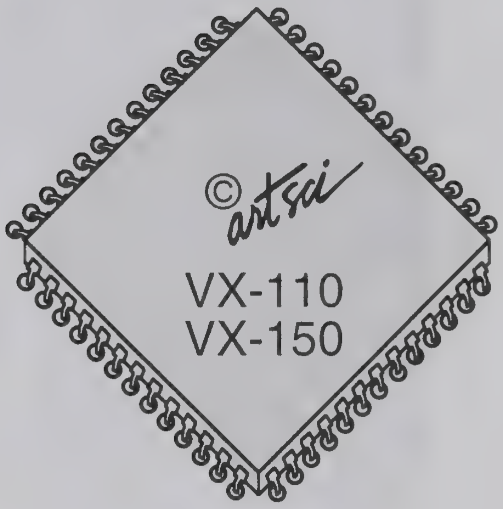
Expansion Range

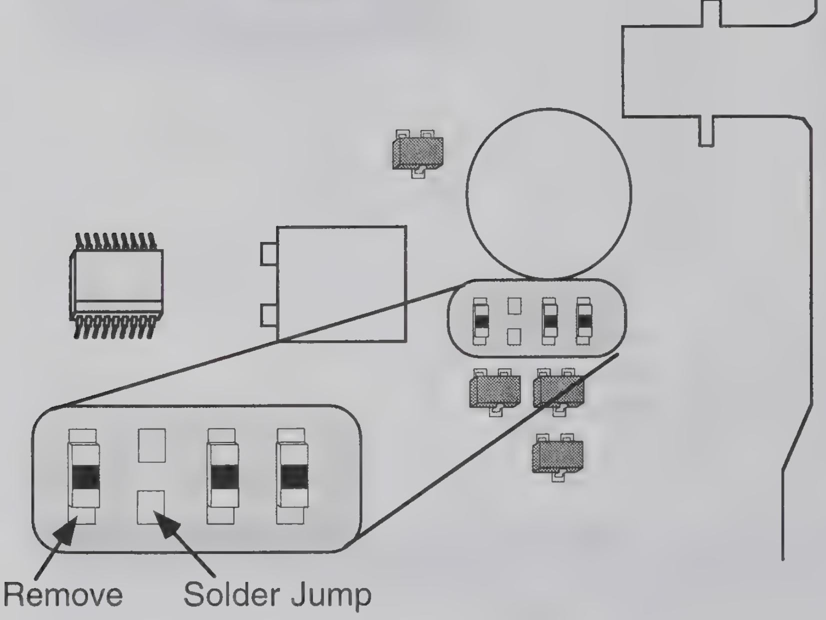
Not all versions will get full expansion

140 - 174 MHz

CAUTION:

Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.





Modification Instructions

1. Remove battery and antenna.
2. Remove screws and open radio
3. **Remove R1275**
4. **Solder Jumper R1274**
5. Reassemble the radio
6. Reset the radio. If required

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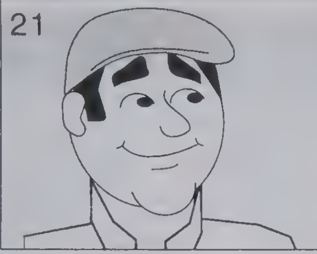


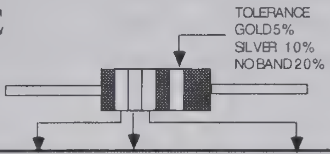
BOB Simpleton's Guide to Color codes

As seen in the ***Amateur Radio Trader***

The electronic industry created a standard for color coding parts many, many years ago. The same color code is used on all different types of components. With a little effort, and a good memory, the basic color code can be memorized. In color code sequence is: BLACK, BROWN, RED, ORANGE, YELLOW, GREEN, BLUE, VIOLET, GRAY and WHITE. The number sequence that corresponses with the color code starts with zero; Black=0, Brown=1, Red=2, etc.

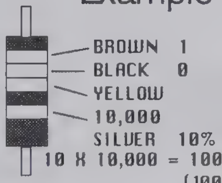
Components using color stripes and surface mount components use the 'significant' digit system paired with a multiplier digit, based on the powers of ten. An additional color stripe is also used to determine the accuracy or tolerance of the component. Higher accuracy components requires more significant digits to accurately describe the value. 5% accuracy parts use two 2 significent digits colors stripes followed by the multliper color stripe. 2% and 1% components often use 3 significent digit colors stripes .

RESISTOR COLOR CODE



COLOR	1st DIGIT	2nd DIGIT	MULTIPLY BY
BLACK	0	0	1
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
VIOLET	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	1,000,000,00
GOLD			0
SILVER			.1
			.01

Example

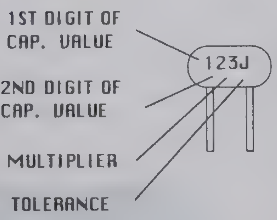


10 X 10,000 = 100,000
(100K)
OHMS

Resistor standard values (significant digits)

10	brown	black	33	orange	orange
11	brown	brown	36	orange	blue
12	brown	red	39	orange	white
13	brown	orange	43	yellow	orange
15	brown	green	47	yellow	purple
16	brown	blue	51	green	brown
18	brown	gray	56	green	blue
20	red	black	62	blue	red
22	red	red	68	blue	gray
24	red	yellow	75	purple	green
27	red	purple	82	gray	red
30	orange	black	91	white	brown

CAPACITORS



MULTIPLIER		TOLERANCE		
	MULTIPLY BY		10pF or less	over 10pF
0	1	B	0.1pF	
1	10	C	0.25pF	
2	100	D	0.5pF	
3	1,000	F	1.0pf	1%
4	10,000	G	2.0pf	2%
5	100,000	H		3%
		J		5%
8	.01	K		10%
9	0.1	M		20%

Most common resistors are in the 5 to 10% tolerance range. Silver is used for 10% and gold is used for 5%. 20% resistors have no tolerance color bar.

One very common resistor is color coded: red red orange gold. Take a moment and see if you can use the attached resistor table and calculate the value..

If you calculated a 22,000, 5% resistor, you are correct. It is calculated like this: $22 \times 10^3 = 22,000$. What possible readings would you expect if you connected this resistor to an ohm meter?

Since it is a 5% tolerance resistor, the measured value will be between 19.800 and 24,200 ohms. That is calculated be allow 5% above and below the stated value.

Surface mount resistors do not use color stripes. The 2 significent digits and multiplier digit are printed right on the top of the component. These components are very, very small. The printed digits are often so small, you may need a magnifying glass to read them.

A surface mount resistor marked 103 would be a 10,000 ohm resistor (10k ohms). For everyone interested in mathematics, the formula is $10 \times 10^3 = 10,000$

A little practice will make reading resistors and other electronic componets easy as pi. 73, Bob

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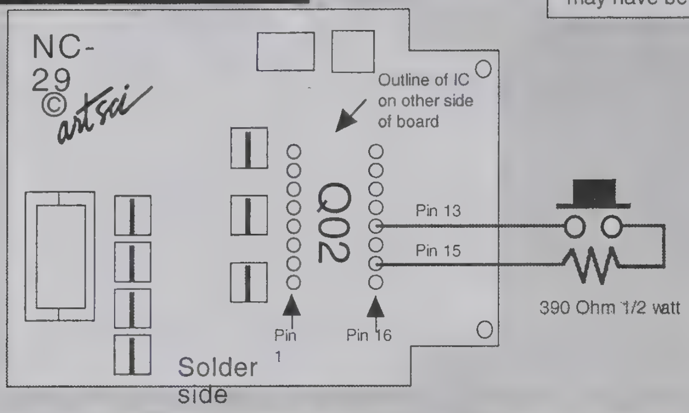
YAESU NC-29
NC-42

Charging additional batteries

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.



NC-29 Modification Instructions

This modification will allow you to select the amount of time used to fast charge your battery pack. The standard NC-29 will fast charge a battery for five hours and then switch to trickle charge every time a battery is inserted, even if the battery is fully charged.

This modification will provide a push button to speed up the Internal clock. By pressing the button, you can watch the time remaining LEDs on the panel and select the amount of full charging time.

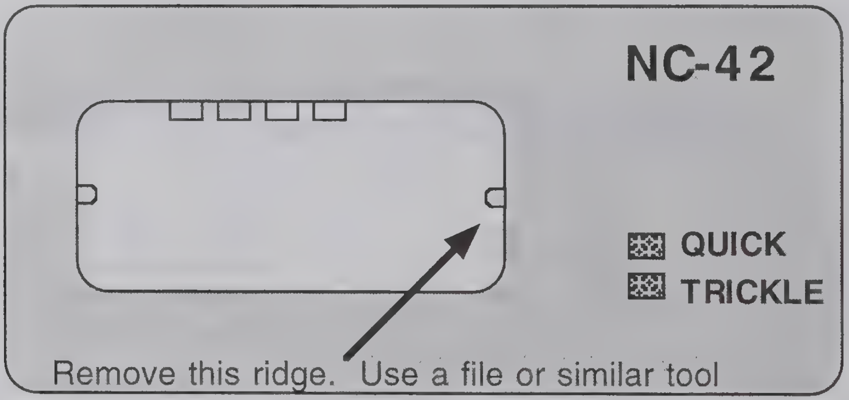
1. Unplug the charger for the AC power
2. Locate IC Q02. see drawing
3. Solder tack a 390 Ohm 1/2 watt resistor and a normally open push button to Pins 13 & 15
4. Position the push button switch in a handy position on the plastic case.

NC-42 Modification Instructions

This modification will allow you to charge FNB-12S, FNB-14, FNB-17, FNB-25, FNB-26 and FNB-27 batteries.

1. Remove the ridge on the inside of the battery charging cup. (right side only)

Charging time for all batteries should be about 1 hour or less.



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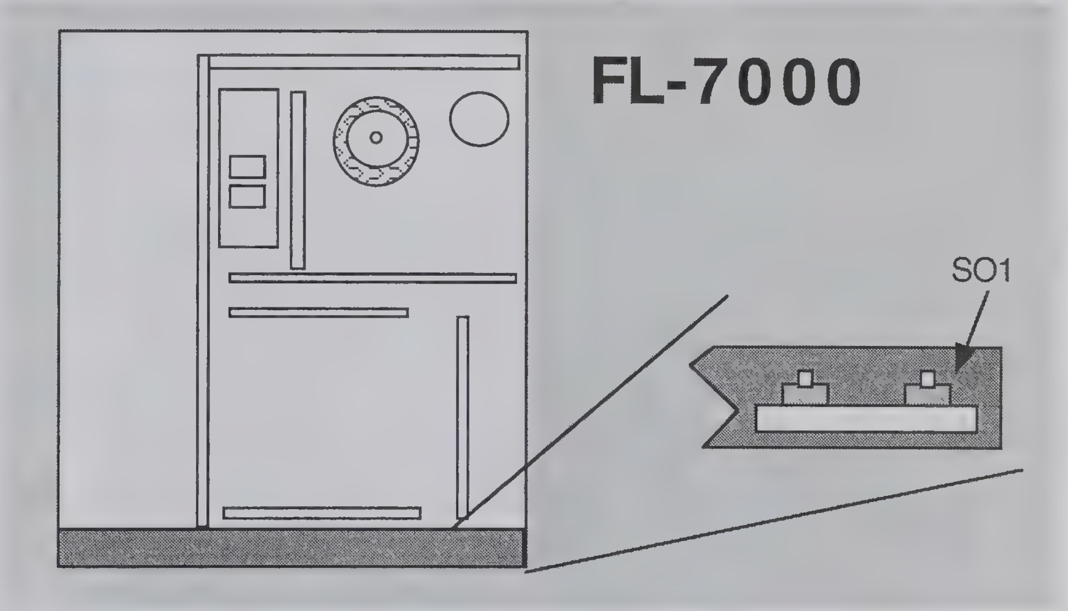
Receive and Transmit Expansion

YAESU FL-7000

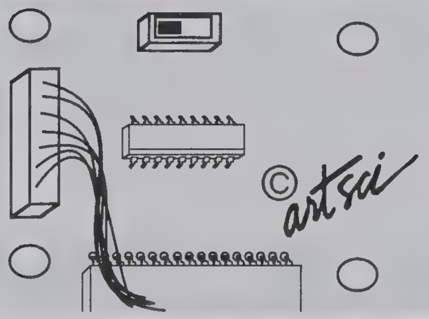
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range
Not all versions will get full expansion
24.5 MHz & 28 MHz



S01



Modification Instructions

1. Remove Power cable and all other cables.
2. Remove 4 screws from the top cover.
3. Remove the top cover and the right and left panels.
4. Remove 4 screws from the power combiner unit and remove screen plate.
5. **Locate Switch SO1 on the CPU unit and set it to the off position.**
   (A small screwdriver can be used to reach the switch.)
6. Reassemble the unit.

Receive and Transmit Expansion

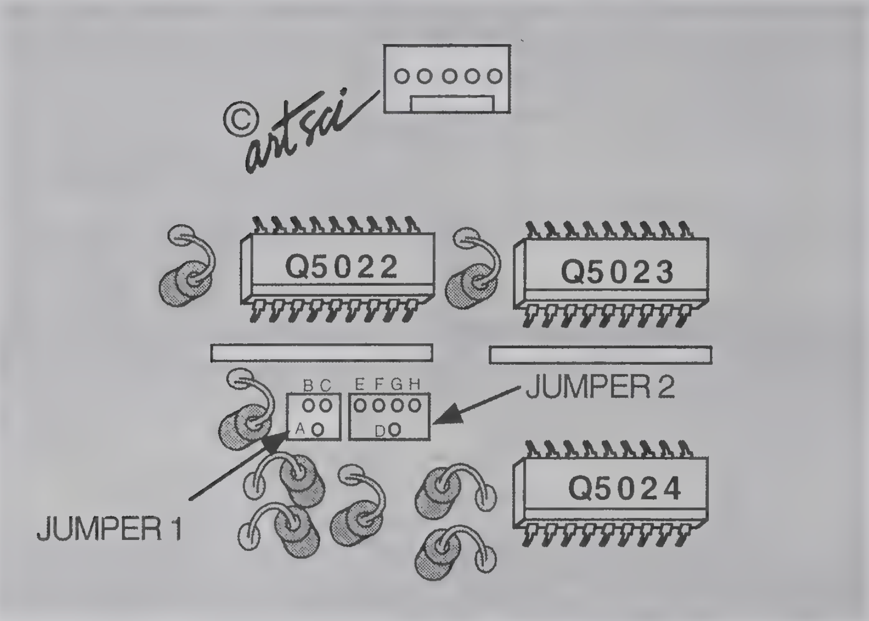
Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

Expansion Range

Not all versions will get full expansion

RX: 150 kHz - 30 MHZ
TX: 1.8 MHz - 30 MHz



Modification Instructions

1. Unplug the power from the radio.
2. Open radio and locate the CONTROL UNIT.
3. **Locate and install a Jumper between Point A and point B.** No Jumper to point C.
4. **Remove any jumper to point D.** (Transmit range point)
5. Reassemble radio.

FT-11 **FT-41** **FT-26** **FT-76**	Master Reset	Press and hold [UP] & [DOWN] & turn on.
	Ham/Extended RX	Press and hold [UP] & [DOWN] & turn on.
	Factory Defaults Soft Rese (memory clear)	Press and hold [T] & [REV] & turn on.
	Master Reset	Press and hold [D/MR] & [T] & [REV] & turn on. (must enter new band limits)
FT-411E **FT-811** **FT-911** **FT-415** **FT-416** **FT-470** **FT-815** **FT-530**	Ham/Extended RX	Press and hold [UP] & [DOWN] & turn on.
	Factory Defaults	Press and hold [T] & [REV] & turn on.
FT-2400H	Ham/Extended RX	Press and hold [UP] & [DOWN] & turn on
	Memory Reset	Press [D/MR] & [F/w] & turn on.
	Factory Defaults	Press [D/MR] & [REV/SKIP] & turn on & turn off & Press & hold [D/MR] & turn on.
FT-5100	Factory Defaults	Press and hold [D/MR] & [REV] & turn on.
FT-5200	Ham/Extended RX	Press and hold [MHz] & [DVS/HOLD] & turn on.
	Factory Defaults	Press and hold [D/MR] & [REV] & turn power on.
FT-212 **FT-712** **FT-912**	Ham/Extended RX	Press and hold [MHz] & [VOICE] & turn power on.
FT-290 **FT-690** **FT-790II**	Hard Reset	Switch internal backup switch off of 30 seconds.
FT-736R	Hard Reset	Switch internal backup switch off of 30 seconds.
FT-1000	Hard Reset	Flip off BACKUP switch. (Inside the top panel window)
	Memory Reset	Press & hold [SUB] & [ENTER] & turn power on
	Soft Reset	Press & hold [1.5] & [3.5] & turn power on. (For checking Display and ROM version)
FT-990	Hard Reset	Flip off BACKUP switch. (Inside the top panel window)
	Memory Reset	Press & hold [GEN] & [ENT] & turn power on
	Soft Reset	Press & hold [1.5] & [3.5] & turn power on. (For checking Display and ROM version)
FT-890	Hard Reset	Press & hold [HAM/GEN] & [CLAR] & turn power on.
	Soft Reset	Press & Hold [A/B] & [A=B] & turn power on (For checking Display and ROM version)
FT-767GX	Hard Reset	Switch [B.U.] off & turn radio on.
	Freq. Range Reset	Press and hold [OFFSET] & turn power on. (140.00 - 148.99 MHz) Press and hold [CLAR] & turn power on. (140.00 - 145.99 MHz) Press and hold [MCK] & turn power on. (140.00 - 1487.99 MHz)
	430/440 toggle	Press and hold [0] & turn power on.
FT-757GX	Hard Reset	Press & hold [MARKER] & [LINEAR] & turn power on.
FT-747GX	Hard Reset	Slide Backup switch towards tuning dial. (Located on bottom of panel)
FRG-8800	Hard Reset	Remove backup batteries
FRG-100	Hard Reset	Turn off backup switch on rear of radio for 5 seconds.

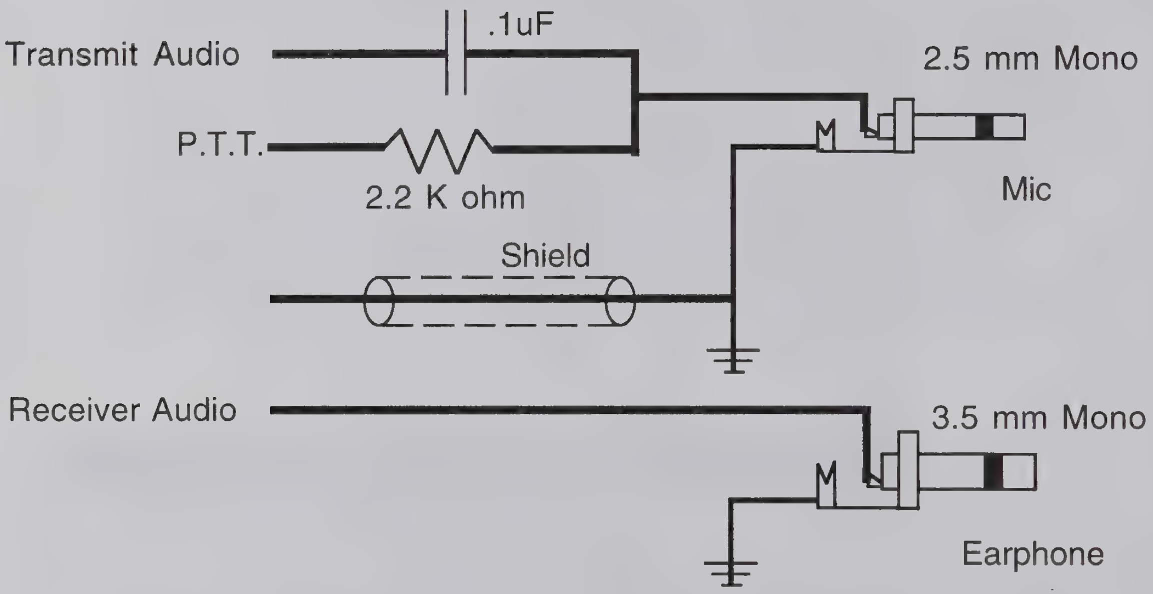
TNC Hookup

Most Radios will operate within a 20-30 MHz range of the original frequency. You may have better performance at the top or the bottom ends of the tuneable range.

CAUTION:
Some mods requires special CMOS rated equipment and familiarity with surface mount soldering techniques.

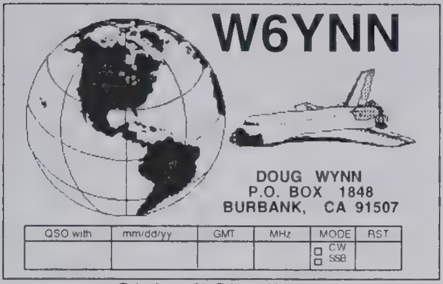
Parts Required

- 1 - 0.1 uF, 50V Disk Ceramic Cap
- 2 - 2.2k Ohms, 1/4 Watt Resistor
- 1 - 2.5 mm audio plug
- 1 - 3.5 mm audio plug



QSL Card Order Form

QSL CARD ORDER FORM



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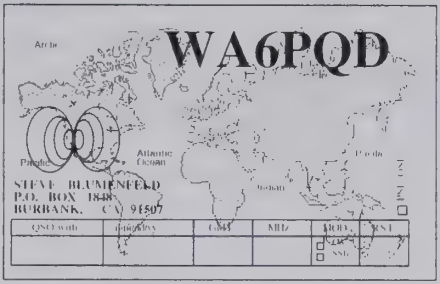
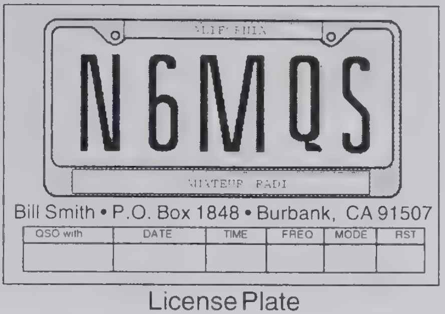


World Map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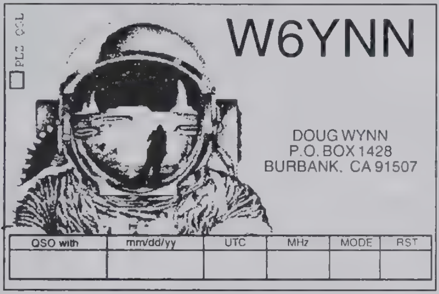
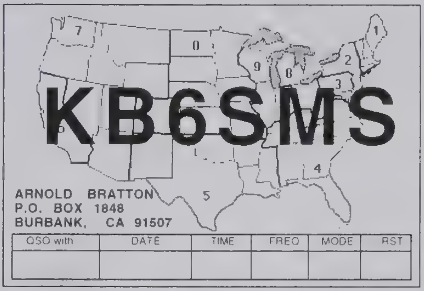
QSO with
DATE
TIME
FREQ
MODE
RST

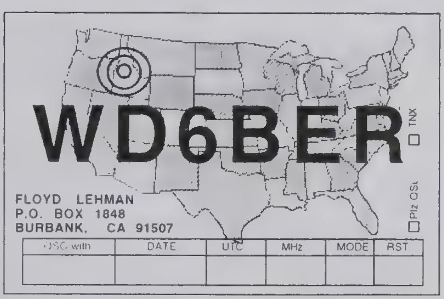
License Plate



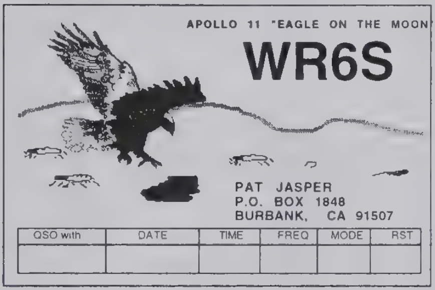
Astronaut



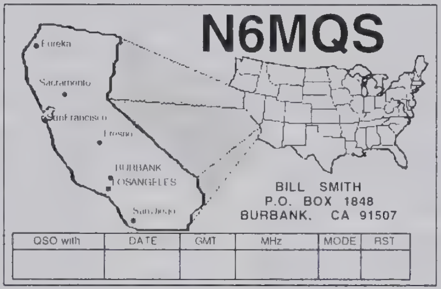
U.S. Map Ham Zones



U.S. Map Patchwork



Eagle on the moon



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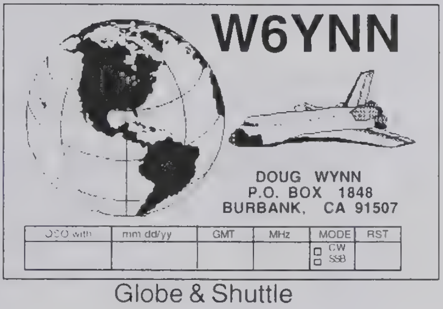

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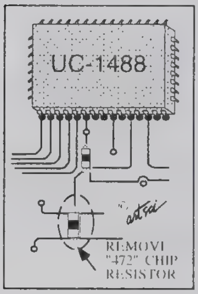
Modifications include extended transmit and receive frequency coverage, cross band (repeater) operation and increased memory channels (different radios have different modification features). Alignment control drawings are presented with most modifications.



Some modifications are very simple to perform, others require experience with soldering and unsoldering. If additional parts are required, the part number and source is given.

This two volume set contains every modification known. There is no need to purchase older volumes, every new volume contains all the old modifications along with data on the new radios.

Volume A contains over 200 pages packed full of information about **KENWOOD** and **ICOM** radios and **Uniden/Bearcat** and **Radio Shack** Scanners.

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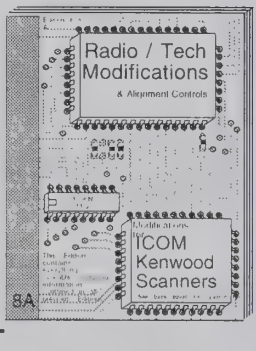

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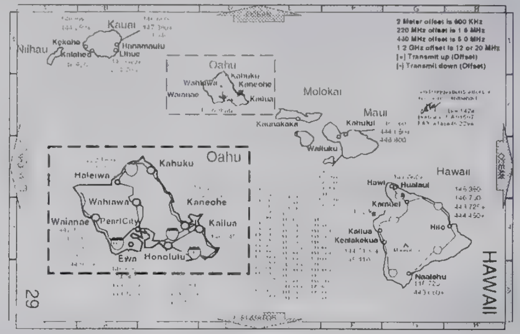

These DETAILED maps show all highways and major cities in each state. If you travel anywhere in the United States, this MAPbook will be the best investment you ever made!!

NEW in this edition are table listings of every know open repeater in the state. 10,6,2 meter, 220, 440 MHz and 1.2 GHz repeaters are shown.

COLORADO OPEN REPEATERS

AKRON			
	145 400-	A	
ASPEN			
	146.670-		
	146 700-		
	147 300-		
	449.975-		
AVON			
	449.900-		
BOULDER			
	145.460-	A	
	146 610-		
	146.700-		
	146 730-		
	146.760-		
	146 745-		
	224.020-		
	224.600-	A	
	224 860-		
	447.375-	CA	
	448.175-		
	448.900-	A	
	449 400-		
	449.550-		
	449 925-		
BRIGHTON			
	224.300-		100.0
	223.980-		
	224 000-		
	224.180-		
	224 340-		
	224 640-		
	224 740		
	224 780-		
	224 080-		
	224 980-	CA	
	447.975-		
BUENA VISTA			
	146.745-		
BURSH			
	224 460-		
CANON CITY			
	147.090+		
	147 210+		
	223 960-		
	447 750-		
CARBONDALE			
	146 760-		
CHEYEN WELLS			
	147.075+	A	
COLORADO SPR			
	145 130-		
	145.160-		
	145 265-		
	146 970-		
	147.135-		
	147 180-		
	224 060-		
	224 820-		
	224 960-		
	444 200+		
	447 250-		
	447 825-		
	448 000-		
	448 450-		
	448.500-		
	448.600-		
CRAIG			
	146 970-		
CRIPPLE CREEK			
	145 460-		
	447 400-		
DEER TRAIL			
	447 875-		
DENVER			
	145.145-	A	
	145.220-	A	
	145 250-	A	
	145 280-		
	145.310-		
DENVER			
	145.355-		
	145 385-		
	145 430-		
	145 475-	A	
	145.490-		
	146.640-	A	
	146 670-		
	146.715-		
	146.805-		
	146.880-	A	
	146.940-		
	146.985-		
	147.120+		
	147 150+	A	
	147.225+	A	
	147 255+	A	
	147 330+		
	147.375+	A	
	147.690-	A	123.0
	53.050-		
	53.090-		
	447 150-	CA	
	447 200-		
	447 400-		
	447 500-		
	447 925-		
	447 950-		
	448.125-		
	448 375-		
	448 500-		
	448.575-		100.0
	448.650-		
	448.975-		
	448.750-		
	448 850-	A	
	448 875-		
	448.925-	A	
	448 950-		100.0
	449 125-		
	449.175-		
	449 225-		
	449.250-	CA	
	449.350-		
	449.450	CA	103.5
	449 600-		
	449 875-		103.5
	449 950-		
	449.975-		
	1287.800-		
	1287.900-		
DILLON			
	146.790-	A	
	146.790-		
DURANGO			
	146.670-	A	
	146 700-		
	449 850-		
ELLICOTT			
	146.685-		
EMPIRE			
	145 370-		
ESTES PARK			
	146 985-		
FAIRPLAY	147.360+	A	
FORT COLLINS			
	145 115-		100.0
	147 360+	A	100.0
	449.850-	CA	100 0
FORT LUPTON			
	224 400-		
FORT MORGAN			
	147 240+	A	
GENOA			
	146 895-		
	147 060+		
GLENWOOD SPRINGS			
	146 880	A	107.2
	447 100-		
	449.600-		107.2
GRAND JUNCTION			
	146.790-		
	146.820-		107.2
	146 940-		
	147.285+		
	223.940-		
	224.260-		
	448 200-		118.8
	449.200-		107.2
	449.300-		107.2
GREELEY			
	147.000+	A	
	224 940-		
	448.475-		
	449 325-		
	449 475-		
	449.725-	A	
GUNNISON			
	147 120+		
HASWELL			
	447.100-		
HOLYOKE			
	146.955-		
KREMMLING			
	147.075+		
	147.285+		
LA JUNTA			
	146.700		
LAFAYETTE			
	224.760-		
LAMAR			
	146.610		
	147 150+		
LEADVILLE			
	145.445		
LIVERMORE			
	146.625-		
LONGMONT			
	147.270+	A	
	448 525-		
	448.800-		
LOVELAND			
	147.195+	A	
	224.140-		
	448.025-		
	449 575-		
MEEKER			
	146 730-		
MONTROSE			
	145 145-		107.2
	146.910-		
	147.150+	A	
MONUMENT			
	223.920-	A	
	447.725-		
NORWOOD			
	146 640-		
PASOSA SPRINGS			
	146.610-	A	
PUEBLO			
	145.115-		
	146.655-		
	146 880-		
	147 000+		
	53.030-		
	224.260-		
	224.720-	A	
	447 175-		
	447.450-		
	447 950-		
	449 550-		
	449 850-		
RANGELY			
	449 950-		114.8
RIFLE			
	146.985-		
SALIDA			
	147.285+		
SPRINGFIELD			
	146 640-		
STEAMBOAT SPRINGS			
	449.650-		
	147.210+		
STERLING			
	145.175-		
	146.790-		
	448.150-		
VAIL			
	146.610-		
	448.650-		
WALSENBURG			
	146.730-		
	224.320-		
	448.550-		
WIDEFIELD			
	146.625-		
	448 725-		
WINDSOR			
	146.850-		
WINTER PARK			
	146.820-		
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BOB Simpleton's Guide to PL Decoding/ speaker Muting

It is sometimes useful to keep your radio on at all times while waiting for an important call. However the chatter of other users may become a problem.

My good friend Bill likes to have his wife Jan monitor the base radio at home. During high radio traffic times, she will turn the volume down to avoid listening to others. It is then to low for her to hear Bill when he calls.

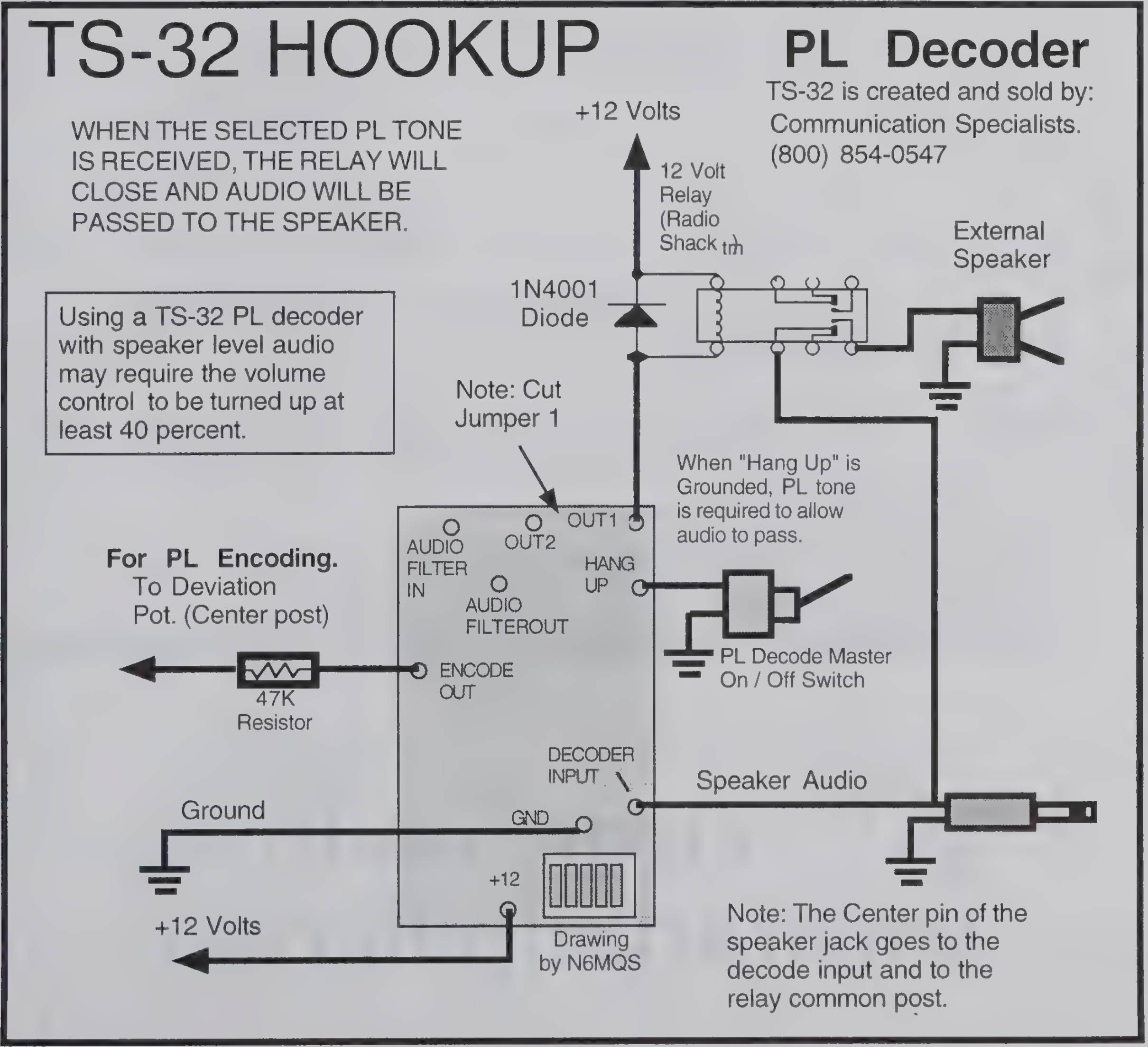
Bill put together this simple PL decoder circuit and attached it to his base radio. Now the radio speaker is disconnected unless the proper subaudable PL tone is used. Bill always transmits the correct PL tone when he wants to talk to Jan at home. He keeps the base radio volume very high so Jan can hear him calling from almost anywhere in the house.

His circuit was created using the popular TS-32 PL Decoder by Communication Specialists. Most repeater systems use this decoder because it is very reliable and simple to use.

He has included a defeat switch to remove the PL requirement when using the radio for normal two-way communications. The TS-32 PL Decoder board has a special "HANG UP" pin that is grounded through the switch and will keep the relay triggered and all audio will pass to the speaker.

Bill suggested using the other side of the relay to activate a horn, buzzer or light of some kind. I built one of these circuits and used it in the car to flash a light when one of my friends call me. I see the light and turn the stereo down and answer the call. 73 and have some fun.

TS-32 HOOKUP



PL Decoder

TS-32 is created and sold by:
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(800) 854-0547

WHEN THE SELECTED PL TONE IS RECEIVED, THE RELAY WILL CLOSE AND AUDIO WILL BE PASSED TO THE SPEAKER.

Using a TS-32 PL decoder with speaker level audio may require the volume control to be turned up at least 40 percent.

When "Hang Up" is Grounded, PL tone is required to allow audio to pass.

Note: The Center pin of the speaker jack goes to the decode input and to the relay common post.

Drawing by N6MQS

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DJ-162
DJ-180
DJ-190
DJ-191
DJ-195
DJ-280
DJ-460
DJ-500
DJ-560
DJ-580
DJ-582
DJ-C1
DJ-C4
DJ-C5
DJ-F1T
DJ-G1T
DJ-G5T
DJ-S11T
DJ-S41T
DJ-V5T
DR-110T
DR-112T
DR-119T
DR-130
DR-140
DR-150
DR-430
DR-510
DR-570
DR-590
DR-592
DR-599
DR-600
DR-605
DR-610
DR-1200
DR-M03
DR-M06
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C-158
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President
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Ranger
R C A
R C I
Regency
Robyn
Royce
Sanyo
S B E
Sears
Siltronics
Sharp
Superstar
Teaberry
Tenna Phase
Tram
Truetone
Uniden
VTAC
Vector
Wards
Whistler
Xtal
Zexon

OTHER

ADI

AR-146/446
AT-18
AT-200
AT-201
AT-400/48
AT-600

AMERITRON

AL-80/A/B
AL-82, AL-572
AL-800/H, AL-811/H
AL-1200, AL-1500

AZDEN

AZ-21, AZ-61
PSC-6000, 7000, 7500

DRAGON

RPSY-201
RPSY-497

MAGNUM

Alpha Force
Delta Force
130, 257
357DX, 457DX
502, SSB-10
Millennium 2002
Millennium 3003

HEATH

H-2 Mini HT
H4-HT, HW-24
HW24HT
SB-1400

KDK

KDK-240
KDK-2033

MIDLAND

73-030

RANGER

AR-3300, AR-3500

RCI

RCI-2950, RCI-2970

SENDER

TR-145
TR-450

SGC

GS-2020

TANDY

HTX-100

TEN TEC

PARAGON

UNIDEN

HR-2500, HR-2510
HR-2600

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FT-11
FT-23
FT-26
FT-33
FT-40
FT-41
FT-50
FT-51
FT-73
FT-76
FT-90
FT-100
FT-209
FT-211
FT-212
FT-227
FT-290
FT-311
FT-411
FT-415
FT-416
FT-470
FT-530
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FT-709
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FT-757GXII
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FT-817
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FT-VX1
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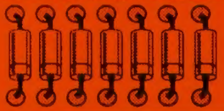

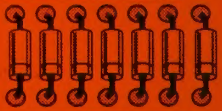

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